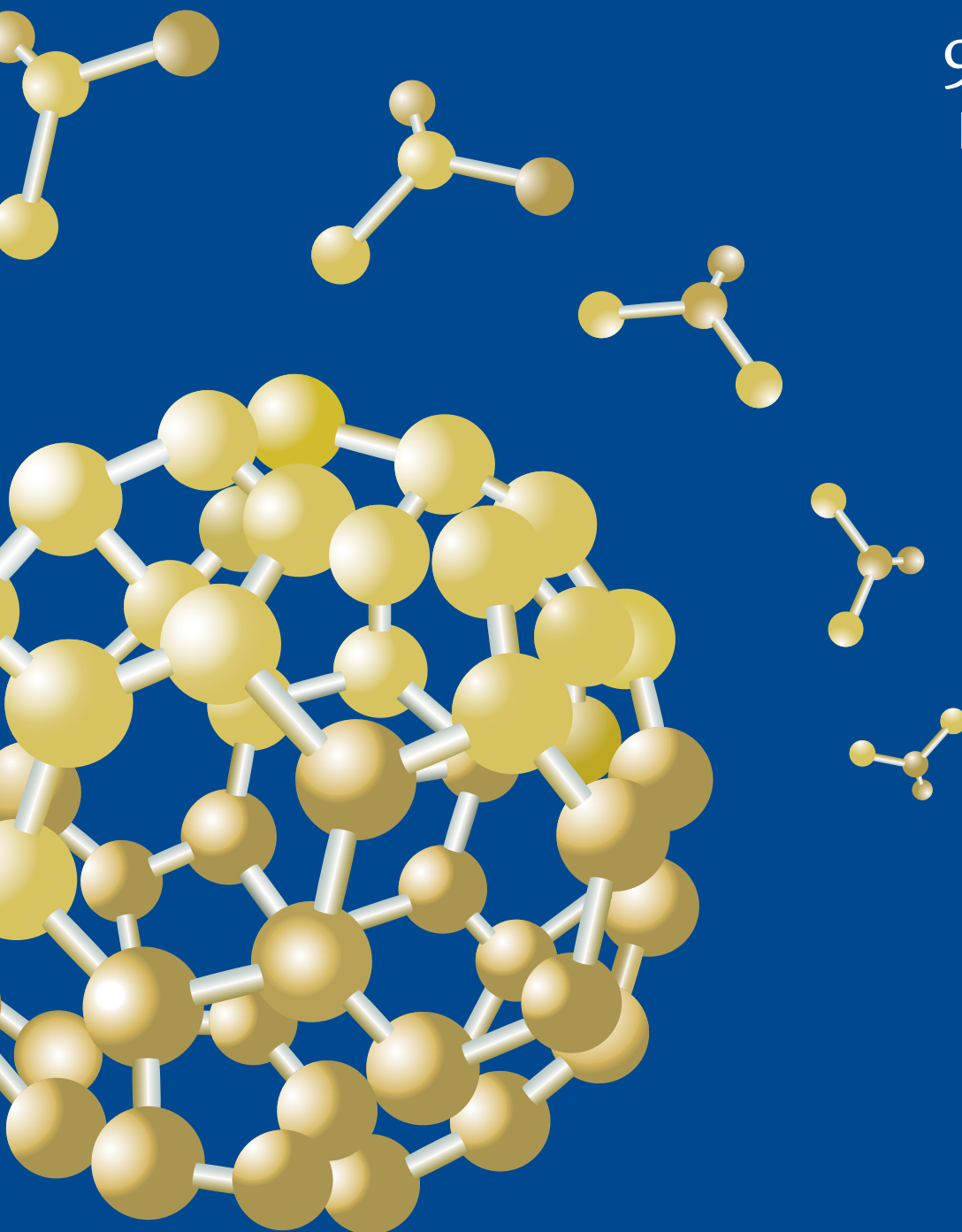


9. TRIMOVE  
RAZISKOVALNE  
NAGRADE

9<sup>TH</sup> TRIMO  
RESEARCH  
AWARDS

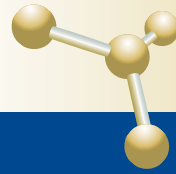
2010



# KAZALO

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## NAGOVOR GLAVNE DIREKTORICE

### GENERAL MANAGER'S ADDRESS

Spoštovani!

V Trimu smo že leta zavezani trajnostnemu razvoju. To pomeni, da močno povezuujemo tiste deležnike, ki temu procesu dodajajo stalno novo energijo. Energija pa je tema, o kateri razpravljajo svetovni državniki, izumitelji, raziskovalci, proizvajalci, okoljevarstveniki in potrošniki. Energija je tudi tisto, kar nas povezuje kot človeška in ustvarjalna bitja. Veliko ustvarjalne energije ste vložili tudi vi, dragi raziskovalci, pri pripravi novih znanstvenih dognanj na različnih področjih.

Nova teoretična spoznanja pomenijo tudi začetek novega procesa, ki se iz akademske sfere nadaljuje v poslovni proces do končnega kupca skozi materialne, kulturne, duhovne ali kakšne druge dobrine, ki jih nova spoznanja prinašajo v zakladnico svetovnega znanja.

Z zakladi pa je tako, da če so skriti in neuporabljeni, nimajo tiste zlahke vrednosti, katero pridobijo ravno z razdajanjem za dobrobit človeka in celotne družbe. Zato smo se v Trimu odločili, da bomo razkrili najboljša nova spoznanja s področij arhitekture, ekonomije, strojništva, gradbeništva in geodezije, elektrotehnike, industrijskega oblikovanja, človeških virov, prava, organizacije, inovacij in jih predstavili tudi širše.

Še lepši sijaj bodo dela dobila, ko bodo potrjena v praksi, tako da bodo dala svoj praktični prispevek razvoju človeške družbe.

Skupaj z letošnjimi 61 nagrajenci je Trimo doslej izbral 348 nagrajencev za raziskovalna dela. S tem želimo izraziti zahvalo in pohvalo vsem, ki s svojimi dognanji prispevate k razvoju družbe in tudi Trimu odpirate nove poglede in spoznanja za trajnostni razvoj, ki upošteva interese vseh deležnikov.

Zelo pomembna so naša vsakoletna srečanja s podelitvami nagrad najboljšim izbranim raziskovalcem zaradi neposredne komunikacije in pogosto odkritja novih raziskovalnih priložnosti za raziskovalce, fakultete in Trimo.

Vsem letošnjim dobitnikom Trimovih raziskovalnih nagrad iskreno čestitam in želim še veliko vznemirljivih raziskovalnih projektov. Zahvaljujem se vsem mentorjem, dekanom fakultet in rektorjem univerz, ki spodbujate povezavo med akademsko sfero in gospodarstvom ter na ta način odpirate možnost za neposredno komunikacijo in pospešujete nadaljnji razvoj. Hvala tudi vsem recenzentom, ki ste svoj prosti čas namenili temu, da ste naredili jagodni izbor letošnjih nagrajencev.

Vsem želim ustvarjalno prihodnost.

Tatjana Fink, MBA,  
glavna direktorica, Trimo, d. d.

Ladies and gentlemen,

For years Trimo has committed itself to sustainable development. This means that we closely work with participants that add continual new energy to this process. Energy is a topic under constant discussion from statesmen, inventors, researchers, producers, protectors of the environment, and consumers all over the world - all looking for solutions to this topic. Energy is also what we have in common as humans and creative beings. And you, my esteemed researchers, have also invested a lot of your creative energy in making new scientific findings in your various areas of expertise.

New theoretical discoveries also mean the start of a new process that travels from academia into business processes, and further down to the end-buyer, via material, cultural, spiritual gains, or other forms of goods - that new discoveries bring to the treasure trove of world knowledge.

But hidden and unused treasures do not have the same value as when used for the good of humankind and society. That is why Trimo decided to disclose the best new discoveries in architecture, economics, civil engineering, construction, electrical engineering, industrial design, human resources, law, organisation, and innovation; and introduce them extensively to our clients.

Research work will become even more important once the theoretical findings are confirmed in practice, and provide their practical contribution to the development of human society.

Trimo now has a total of 348 Trimo award-winners for research work, including this year's 61 award-winners.

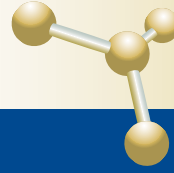
That is why we would like to commend and thank everyone whose findings helped make a contribution to the society's development, as well as opening new perceptions and recognition regarding sustainable development for Trimo, that considers the interests of all stakeholders.

Our annual meetings and the awards for the best chosen pieces of research are very important, as they serve as direct communication, and often help discover new research opportunities for universities, and Trimo.

I would like to congratulate this year's winners of Trimo Research Awards and wish you many exciting research projects in the future. Also, I want to thank all the mentors, Deans of faculties, and Rectors of universities, who encourage co-operation between academia and the business sector, and thereby open opportunities for direct communication, and speed up continual development. A big thank you goes to all reviewers that have dedicated their free time to making the special selection - of this year's winners.

I wish you all a creative future.

Tatjana Fink, MBA  
General Manager, Trimo, d.d.



## NAGOVOR PREDSEDNIKA KOMISIJE

### PRESIDENT OF THE RESEARCH BOARDS' ADDRESS

Spoštovani!

S Trimovimi raziskovalnimi nagradami vedno znova dokazujemo, da je sodelovanje med znanostjo in gospodarstvom ne samo možno, ampak tudi nujno. In celo več, da je vedno boljše.

V časih splošnega skepticizma Trimove raziskovalne nagrade odpirajo drugačne perspektive in kažejo nove poti. Čase zmernega pesimizma demantiramo s superlativi: rekordno število nagrajenih: 61, rekordno število udeleženi fakultet: 26, rekordno število držav: 9. Skupaj v devetih letih že približno 350 nagrajencev, 200 mentorjev, 50 fakultet.

Danes bolj kot kdaj koli potrebujemo vašo vizijo, znanje in vztrajnost. Skupaj dodajamo še tisto, kar današnja družba nujno potrebuje, in sicer samozavest in odločnost za dejanja. Dejanja, ki oblikujejo sedanjost.

Čestitke in zahvala nagrajencem, njihovim mentorjem, recenzentom, komisiji za Trimo raziskovalne nagrade ter vsem tistim, ki ste omogočili letošnji dogodek. Skratka, vsem vam, ki ne glede na vsakodnevne ovire skupaj z nami razmišljate, delate in ustvarjate prihodnost! Prepričan sem, da je zato kanček bližja in svetlejša!

Miloš Ebner, MBA  
predsednik komisije za raziskovalno delo,  
Trimo, d. d.

*Ladies and gentlemen,*

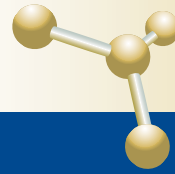
*The Trimo Research Awards prove once again that the cooperation between science and the economic sector is not only possible but also necessary – and it is also constantly improving.*

*In times of general scepticism the Trimo Research Awards open different perspectives and point to new paths. We counter these pessimistic times with superlatives: a record number of award-winners: 61; a record number of participating universities: 26; a record number of countries: 9; which brings us to a total of approximately 350 award-winners, 200 mentors, and 50 university faculties in the past 9 years.*

*We need your vision, knowledge, and persistence now more than ever. Together we add qualities that are desperately scarce in today's society – confidence and determination, to take action – the type of action that can shape today's world.*

*I would like to congratulate and thank the award-winners, their mentors, reviewers, the committee for Trimo Research Awards, and all the people who made this event possible – that is, to all of you who think, work, and create the future together with us despite the everyday obstacles. In my opinion, you help bring the future a little bit closer and make it a little bit brighter.*

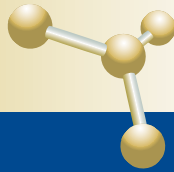
*Miloš Ebner, MBA  
President of the research work committee  
Trimo d.d.*



## KOMISIJA ZA RAZISKOVALNO DELO

### RESEARCH BOARD

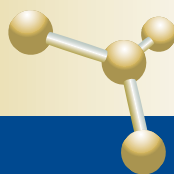
1. Miloš EBNER - *predsednik / president*
2. Danijel ZUPANČIČ - *član / member*
3. Breda KOTAR - *član / member*



## RECENZENTI

### REVIEWERS

1. Polona ADAMIČ
2. Bojan ADAMOVIČ JUG
3. Polona BRIŠKI
4. Andrej ČAMPA
5. Boštjan ČERNE
6. Jože DRČAR
7. Miloš EBNER
8. Laura FINK
9. Tomaž HOZJAN
10. Anton JANC
11. Mojca JAPELJ FIR
12. Aleš JARC
13. Marjan JARC
14. Miha KAVČIČ
15. Sonja KLOPČIČ
16. Damir KOČAN
17. Ljudmila KOPRIVEC
18. Breda KOTAR
19. Primož KOZLEVČAR
20. Aleš KRALJ
21. Franci KRALJ
22. Maja LAPAJNE
23. Špela LOKAR
24. Simona OSTANEK
25. Slavica OSTERMAN
26. Aleš POR
27. Damjan SINIGOJ
28. Blaž SKUBIC
29. Janez SLUGA
30. Denis STEPANČIČ
31. Matjaž STRAŠEK
32. Marta STRMEC
33. Tatjana ŠINKOVEC
34. Jara ŠPEGAR KNEZ
35. Silvo ŠTIH
36. Simon ŠTUMPF
37. Aleksandra VIŠČEK
38. Vinko VOVK
39. Mitja VOVKO
40. Jože ZALETELJ
41. Viktor ZALETELJ
42. Danijel ZUPANČIČ
43. Gašper ŽEMVA
44. Matjaž ŽNIDARŠIČ



## NAGRAJENCI

### AWARDEES

## DIPLOMSKA DELA

### DIPLOMA PAPERS

1. Milana ALEKSIĆ, Andjelka BOROVIĆ *Srbija/Serbia*
2. Vid ARNEŽ, *Slovenija/Slovenia*
3. Tomaž BARTOLJ, *Slovenija/Slovenia*
4. Neda BEZJAK, *Slovenija/Slovenia*
5. Robert BRAJKOVIČ, *Slovenija/Slovenia*
6. Marko BROZOVIČ, *Slovenija/Slovenia*
7. Vanja ČOK, *Slovenija/Slovenia*
8. Miha FILIPIČ, *Slovenija/Slovenia*
9. Bojana GOŠOVIČ, *Srbija/Serbia*
10. Tomaž KOCJAN, *Slovenija/Slovenia*
11. Simon KULOVEC, *Slovenija/Slovenia*
12. Špela LOKAR, *Slovenija/Slovenia*
13. Ferenc LÖKE, *Madžarska/Hungary*
14. Ula MEJAŠ, *Slovenija/Slovenia*
15. Jasmin MUSTAFIĆ MARJETIČ, *Slovenija/Slovenia*
16. Radisav NEDIĆ, *Srbija/Serbia*
17. Ivana POPOVIČ, *Srbija/Serbia*
18. Miha PREBIL, *Slovenija/Slovenia*
19. Peter PRINČIČ, *Slovenija/Slovenia*
20. Tina PULKO, *Slovenija/Slovenia*
21. Tanja PUNTAR, *Slovenija/Slovenia*
22. Matej ROZMAN, *Slovenija/Slovenia*
23. Ana SEKOLEC KOCIJANČIČ, *Slovenija/Slovenia*
24. Nejc TROŠT, *Slovenija/Slovenia*
25. Hana VIDIC, *Slovenija/Slovenia*
26. Klemen VOVK, *Slovenija/Slovenia*
27. Sara ZORZUT, *Slovenija/Slovenia*

## MAGISTRSKA DELA

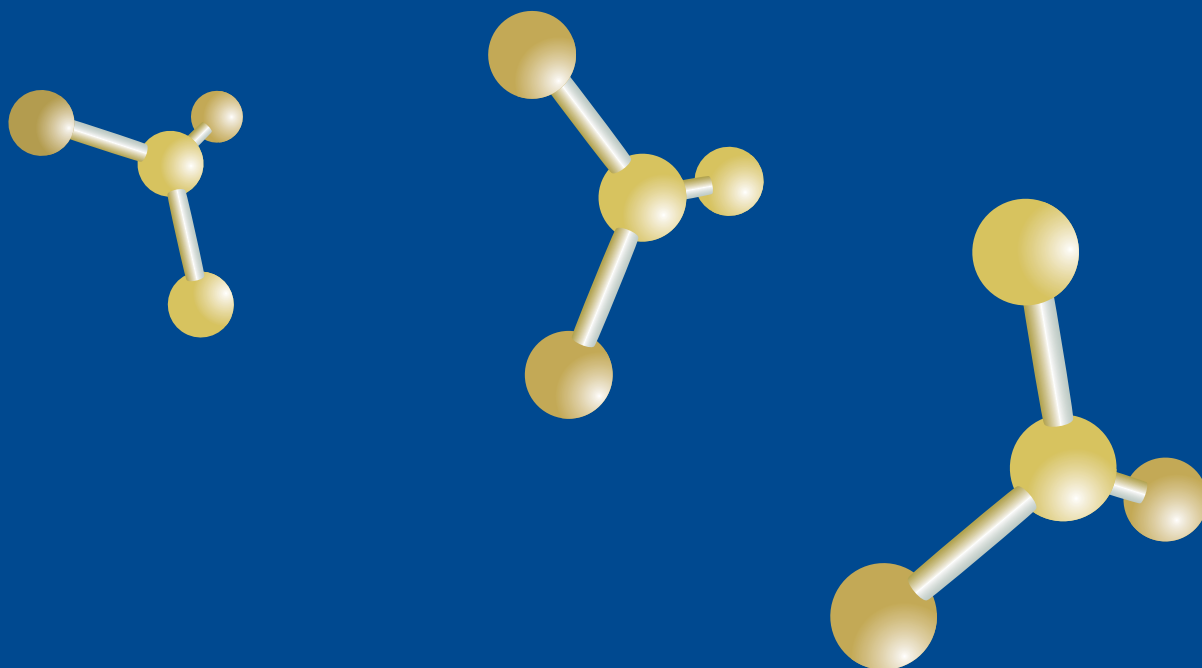
### DISSERTATIONS

1. Matej BASTIČ, *Slovenija/Slovenia*
2. Malči GRIVEC, *Slovenija/Slovenia*
3. Ana JAKI, *Slovenija/Slovenia*
4. Nebojša JAKICA, *Srbija/Serbia*
5. Andrej KNAFLIČ, *Slovenija/Slovenia*
6. Lara MADOTTO, *Slovenija/Slovenia*
7. Sladjana MARKOVIĆ, *Srbija/Serbia*
8. Alenka NAGLIČ, *Slovenija/Slovenia*
9. Tomaž PETAN, *Slovenija/Slovenia*
10. Jure POMPE, *Slovenija/Slovenia*
11. Jermina STANOJEV, *Srbija/Serbia*
12. Nikola STEPKOVIĆ, *Srbija/Serbia*
13. Barbara ŠIFRER, *Slovenija/Slovenia*
14. Tina ŠINKOVEC, *Slovenija/Slovenia*
15. Martina VRBIČ, *Slovenija/Slovenia*

## DOKTORSKE DISERTACIJE

### DOCTORAL THESES

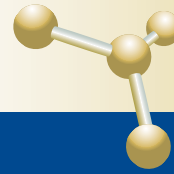
1. Peter BALOH, *Slovenija/Slovenia*
2. Marko BERGINC, *Slovenija/Slovenia*
3. Matej BOROVINŠEK, *Slovenija/Slovenia*
4. Andrej ČAMPA, *Slovenija/Slovenia*
5. Tomaž HOZJAN, *Slovenija/Slovenia*
6. Jelena JOVANOVIĆ, *Črna Gora/Montenegro*
7. Ljudmila KOPRIVEC, *Slovenija/Slovenia*
8. Leon KOS, *Slovenija/Slovenia*
9. Davorin KRALJ, *Slovenija/Slovenia*
10. Jasmina LOZANOVIĆ, *Srbija/Serbia*
11. Danijel MOČIBOB, *Hrvaška/Croatia*
12. Aleš PETEK, *Slovenija/Slovenia*
13. Matej RAJH, *Slovenija/Slovenia*
14. Davor SKEJIĆ, *Hrvaška/Croatia*
15. Caterina SPADA, *Italija/Italy*
16. Boštjan UDOVIČ, *Slovenija/Slovenia*
17. Viktor ZALETELJ, *Slovenija/Slovenia*
18. Tomaž ŽULA, *Slovenija/Slovenia*



ZBORNIK POVZETKOV NAGRAJENIH DEL  
ABSTRACTS OF THE PROJECTS AWARDED

**DIPLOMSKA DELA**

DIPLOMA PAPERS



# MILANA ALEKSIĆ, ANDJELKA BOROVIĆ

## Diplomsko delo

### URBANISTIČNA-ARHITEKTONSKA REŠITEV KOMPLEKSA NACIONALNE ZGODOVINE V PODNOŽJU KALEMEGDANA Z ANALIZO PAVILJONA 1 IN 2

Mentorja: doc. mag. Jelena Živković, dipl. inž. arh., doc. Zoran Đukanović, dipl. inž. arh.  
Somentorja: prof. dr. Miodrag Nestorović, dipl. inž. arh., doc. arh. Borislav Petrović  
Univerza v Beogradu, Fakulteta za arhitekturo

Diplomsko delo obravnava temo, aktualno tako za Beograd kot za Srbijo.

Delo v uvodu razdelano raziskuje nove možne sisteme muzeja, ki v izbranem okolju še niso prisotni. Avtorici preko diagramov in raziskav potreb uporabnikov izbereta za dani problem najugodnejši model.

Po analizi obstoječega stanja in opredelitvi ključnih točk, ki združujejo največje število uporabnikov in imajo hkrati največji prireditveni potencial, je ustvarjena začasna matrica, ki hkrati upošteva najpomembnejša obdobja utrdbe Kalemegdan.

Rešitev postaja del bivanja in presega staro razumevanje turizma, kulture in vsakodnevnega urbanega življenja. Taka mesta postajajo mesta zabave, izobraževanja, simbolnosti in kulture. Prav tako se odpira možnost multidisciplinarnih povezav, saj intervencija zahteva sodelovanje mnogih strokovnjakov: umetnikov, zgodovinarjev, ekonomistov in inženirjev.

Naloga pomeni zgleden urbanistični prispevek k ohranitvi historično in nacionalno pomembnih zapaščin. Rešitev naloge je napredno oblikovan mestni družbeni ambient v obliki paviljonov, ki ponuja možnost izobraževanja in urbane rekreacije.

## Diploma paper

### URBAN-ARCHITECTURAL PROJECT FOR NATIONAL HISTORY COMPLEX BELOW THE KALEMEGDAN FORTRESS WITH AN ANALYSIS OF PAVILIONS 1 AND 2

Mentor: Assistant Prof. Jelena Živković, MSc;  
Assistant Prof. Zoran Đukanović BSc  
Co-mentors: Prof. Dr. Miodrag Nestorović, BSc;  
Assistant Prof. of Architecture Borislav Petrović  
University of Belgrade, Faculty of Architecture

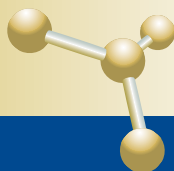
*This diploma paper discusses a topic currently important not only to Belgrade, but also to Serbia.*

*The introduction of the paper contains a structured exploration of possible new systems for a museum that have not been used in this environment. The authors use diagrams, and surveys on consumer use, to find the most appropriate model for a given problem.*

*A temporary matrix was created after analysing the existing state and defining key points that combine the largest number of users and also have the largest performance potential. The most important periods for the Kalemegdan fortress are also considered in this matrix.*

*The solution is becoming a part of living and exceeds the old understanding of tourism, culture, and everyday urban life. These types of cities are becoming centres of fun, education, symbols, and culture. The possibility of multi-disciplinary connections also opens up as intervention demands cooperation of professionals from different areas of expertise: artists, historians, economists, and engineers.*

*The paper presents an exemplary urban contribution to the preservation of important historic and national heritage. This paper contains a solution in the form of an advanced, designed, social and urban environment, transformed by pavilions that present the possibility of education and urban recreation.*



Diplomsko delo

### VPLIV ORGANIZACIJSKIH DEJAVNIKOV NA UPRAVLJANJE ZNANJA

Mentorica: izr. prof. dr. Dana Mesner Andolšek  
Univerza v Ljubljani, Fakulteta za družbene vede

Avtor se ukvarja s problemom upravljanja znanja in z organizacijskimi dejavniki, ki vplivajo na njegovo uspešno implementacijo. Koncept upravljanja znanja preučuje prek procesov ustvarjanja, prenašanja in uporabe znanja.

V teoretičnem delu je poleg razčlenitve posameznih pojmov, ki se navezujejo na upravljanje znanja, največ pozornosti namenjene organizacijskim dejavnikom, ki upravljanje znanja bodisi pospešujejo bodisi zavirajo. Kot ključne organizacijske dejavnike upravljanja znanja avtor opredeli organizacijsko kulturo, vodenje, komuniciranje, informacijsko tehnologijo in upravljanje s človeškimi viri.

Drugi del diplomskega dela je namenjen analizi primera, v katerem so preverjene hipoteze o povezanosti posameznih dejavnikov s preučevanim konceptom. Podrobneje so preučeni tudi procesi ustvarjanja, širjenja in uporabe znanja v podjetju Savatech, d. o. o.

Analiza primera dokazuje, da so preučevani dejavniki pomembno povezani s konceptom upravljanja znanja. Izjemo predstavlja le informacijska tehnologija, ki ji tudi v teoriji raziskovalci pripisujejo manjši vpliv. Uspešno implementiranje koncepta upravljanja znanja tako sovпада z novim menedžerskim pristopom, ki združuje sodobne elemente vodenja, komuniciranja, informacijske tehnologije, upravljanja s človeškimi viri ter organizacijske kulture.

Diploma paper

### INFLUENCE OF ORGANISATIONAL FACTORS ON KNOWLEDGE MANAGEMENT

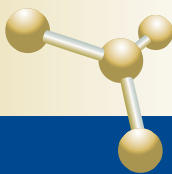
Mentor: Associate Prof. Dr. Dana Mesner Andolšek  
University of Ljubljana, Faculty of Social Sciences

The author considers the problems of knowledge management and the organisational factors which influence its successful implementation. The concept of knowledge management is studied through the processes of creation, transfer, and use of knowledge.

The theoretical part includes the analysis of individual concepts that influence knowledge management. The key organisational factors are defined: management, communication, information technology, and human resources management.

The second part focuses on a case analysis which also tests the determined starting points, or hypotheses, regarding the connection of individual factors with the concept being studied. The processes of creation, expansion, and use of knowledge in Savatech d.o.o., are studied in detail.

The case analysis proves that the factors studied are significantly connected to the concept of knowledge management, with the exception of information technology - which is given less influence, even by the researchers, in theory. Successful implementation of the concept of knowledge management coincides with a new management approach that combines modern elements of management, communication, information technology, human resources management, and organisational culture.



Diplomsko delo

## ZRELOST PODJETIJ ZA TEKMOVANJE NA OSNOVI POSLOVNE ANALITIKE

Mentor: doc. dr. Miha Škerlavaj  
Univerza v Ljubljani, Ekonomska fakulteta

Cilj diplomskega dela je predstaviti in analizirati lastnosti analitično naprednih organizacij, ki se jih označuje s pojmom analitični tekmeči, njihov postopen razvoj in težave, s katerimi so se spopadale, ter način ocenjevanja analitične zrelosti nekega podjetja.

Teoretični del se osredotoča na razlago koncepta poslovne analitike ter tekmovanja na njeni osnovi. Ideja tekmovanja na osnovi poslovne analitike ima mnogo skupnih točk s koncepti poslovne inteligence ter menedžmenta uspešnosti in učinkovitosti poslovanja, zato diplomska naloga podrobneje razloži tudi podobnosti in ključne razlike med temi pristopi k izboljševanju konkurenčnosti podjetja.

V zadnjem sklopu sta petstopenjski model dozorevanja podjetij za tekmovanje na osnovi poslovne analitike in teorija poslovne analitike uporabljena za oceno stanja v slovenskih podjetjih in podrobnejšo analizo specifičnega podjetja. Preučevano podjetje se z mnogih vidikov izkaže kot ilustrativno za slovensko poslovno okolje.

Delo ugotavlja, da se podjetja v Sloveniji pri doseganju najvišjih stopenj analitične razvitosti pogosto srečujejo s preprekami. Zlasti kritične so pretirana tehnološka usmerjenost direktorjev informatike, pasivnost najvišjega vodstva pri načrtovanju informatike in pomanjkanje procesne usmerjenosti. Potrebna bi bila tudi sprememba v politiki zaposlovanja in izobraževanja zaposlenih. Izpostavljeni so nekateri elementi, ki se jim morajo slovenska podjetja še posebej posvetiti, če želijo dohiti analitično najnaprednejše tuje tekmece.

Diploma paper

## MATURITY OF COMPANIES FOR COMPETING ON ANALYTICS

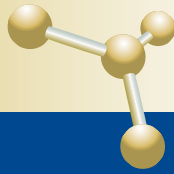
Mentor: Assistant Prof. Dr. Miha Škerlavaj  
University of Ljubljana, Faculty of Economics

*The goal of the diploma paper is to present and analyse features of the most analytically mature organizations, also known as "analytical competitors". It concentrates on presenting the gradual development of these firms, problems they face, and ways of assessing a company's analytical capabilities.*

*The theoretical part deals with the definition of business analytics and competing on analytics. These ideas are related to concepts of business intelligence and business performance management. The thesis explains the differences and similarities of these approaches, which all concentrate on improving the competitiveness of companies.*

*In the last section, a 5 stage maturity model of becoming an analytical competitor, and the theory, are used to give a general assessment of the analytical maturity of the Slovenian business environment as well as of a specific company from the financial services sector. The company researched turns out to be very representative of the current state in the Slovenian economy.*

*It is concluded that Slovenian companies face some barriers when trying to develop into analytical competitors. The main problems are the too technologically oriented CIOs, lack of involvement in defining IT strategy by highest management levels, and lack of process orientation. Changes in HRM policies and additional education of employees are also needed. The paper finishes by emphasising some elements that Slovenian companies should pay special attention to, if they want to catch up with their analytically more developed foreign competitors.*



**NEDA BEZJAK**

Diplomsko delo

## **TEHNOLOŠKE PROCESNE INOVACIJE IN NJIHOVO TRŽENJE; ŠTUDIJA PRIMERA**

**Mentor: prof. dr. Zlatko Jančič**  
**Somentor: doc. dr. Branko Ilič**  
**Univerza v Ljubljani, Fakulteta za družbene vede**

Diplomsko delo interdisciplinarno obravnava pojem tehnoloških procesnih inovacij.

V prvem delu obravnava tehnološko procesne inovacije v kontekstu tehnološkega napredka in izpostavi kompleksnost razmerja med znanostjo in gospodarstvom, kjer je prvo podvrženo neodvisnemu raziskovanju, medtem ko razvoj tehnološko procesnih inovacij znotraj gospodarstva zavzema vlogo gospodarskega napredka in je podvržen ekonomskim silnicam.

Avtorica podrobneje predstavi pomen tehnološko procesnih inovacij znotraj ekonomskih teorij. Podjetja si lahko z razvojem tovrstnih inovacij za zniževanje proizvodnih stroškov zagotovijo konkurenčno prednost pred ostalimi podjetji.

Analizo avtorica nadaljuje s pregledom gospodarskega prava, kjer opiše pomen patentne zakonodaje in predstavi njene omejitve pri pridobivanju patentne zaščite. Prav tako se v svoji študiji posveti medorganizacijskemu trgu, kjer naj bi se menjava in razvoj tehnološko procesnih inovacij tudi odvijala.

V empiričnemu delu se avtorica posveti tehnološko procesni inovaciji malega slovenskega podjetja, ki ga analizira z zgoraj omenjenih vidikov. Možnosti tržnega uspeha tehnološko procesne inovacije poskuša raziskati z analizo njene funkcionalnosti in ekonomske učinkovitosti ter z analizo trga, ki temelji na intervjujih s strokovnjaki z relevantnih področij. Z analizo prikaže kritično stanje in togost slovenske industrije v dohajanju svetovne konkurenčnosti.

Diploma paper

## **TECHNOLOGICAL PROCESS INNOVATIONS AND THEIR MARKETING; A CASE STUDY**

**Mentor: Prof. Dr. Zlatko Jančič**  
**Co-mentor: Assistant Prof. Dr. Branko Ilič**  
**University of Ljubljana, Faculty for Social Sciences**

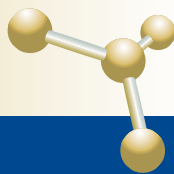
This inter-disciplinary diploma paper discusses the meaning of technological process innovations.

The first part discusses the technological process innovations through the perspective of technological progress and emphasizes the complex relationship between science and industry, where the first is submitted to independent research, while the development of technological process innovation within industry is placed in the role of economic growth and therefore submitted to economic circumstances.

The author makes a detailed presentation of the importance of technological process innovation within economic theories. The development of innovations to reduce production costs can serve as a competitive advantage for a certain company.

The analysis continues with an overview of the commercial legislation, where the importance of the laws on patents is described; the author also presents legal restrictions in the process of acquiring patent protection. The paper also focuses on the interorganisational market where trade and development of technological and process innovations takes place.

The technological process innovation of a small Slovenian business is discussed in the empirical part. It is analyzed from all the above mentioned perspectives. Through the analysis of its functional applicability, economic efficiency, and market research, which is based on interviews with specialists from relevant areas, it tries to research the possibility of marketing success. The analysis presents a critical state and lack of flexibility of the Slovenian industry in keeping pace with competition around the world.



Diplomsko delo

## KRMILJENJE VISOKOSVETILNIH RGB SVETLEČIH DIOD

Mentor: doc. dr. Marko Jankovec  
Univerza v Ljubljani, Fakulteta za elektrotehniko

V diplomskem delu sta obravnavana teoretični in praktični vidik uporabe visokosvetilnih svetlečih diod osnovnih barv, kjer lahko s krmiljenjem posamezne barve generiramo celo paleto barv v barvnem spektru.

Tovrstna svetila izkazujejo velik potencial v aplikacijah ambientne razsvetljave, čemur botruje predvsem hiter razvoj tehnologije svetlečih diod. Obravnavana tematika je široka, saj sega od osnov teorije svetlobe, mešanja barv in barvnih sistemov preko zgradbe in lastnosti belih in barvnih svetlečih diod, principov napajanja in krmiljenja svetilnosti do praktične aplikacije krmilnega sistema za barvni RGB reflektor, za kar je bil izdelan tudi prototip končnega izdelka.

Predstavljeno je celotno načrtovanje sodobnega RGB sistema iz visokosvetilnih svetlečih diod. Aplikacija je razdeljena na posamezne sklope, ki so podrobno obdelani. Prične se z izbiro LED modula, pri katerem je potrebno preučiti karakteristike in se na njihovi podlagi odločiti za izbiro napajalnika. Sledi realizacija preklopnega napajalnika, pri katerem je poudarek na izbiri in izračunu elementov ter izdelavi tiskanega vezja.

Kot zadnji sklop je obdelan krmilnik s pripadajočim programskim delom.

Diploma paper

## DRIVER FOR HIGH-BRIGHTNESS RGB LIGHT EMITTING DIODES

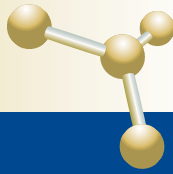
Mentor: Assistant Prof. Dr. Marko Jankovec,  
University of Ljubljana, Faculty of Electrical Engineering

*This diploma paper discusses the theoretical and practical aspect of the use of high-brightness RGB light-emitting diodes in primary colours; by controlling an individual colour we can generate a whole range of colours in a colour spectrum.*

*These types of lights show great potential in applications of ambient lighting - primarily due to the fast development of light-emitting diodes. This is a broad topic as it expands from basic light theory, mixing colours and colour systems, onto structure and characteristics of white and colourful light diodes, charging principles, and lighting control, and practical applicability of the controlling system for the colour RGB reflector - whereby a prototype of the final product was developed.*

*The complete plan of the RGB system from high-brightness light-emitting diodes is presented. The application is divided into individual sections that are discussed in detail. It starts with the choice of an LED module where characteristics have to be studied; and based on these characteristics a decision is made on which power supply to choose. This is followed by the construction of the switching power supply, with emphasis on the calculation of elements and implementation of a printed circuit.*

*The controller and the programming part are discussed in the last section.*



Diplomsko delo

## UPORABA ŠOLSKE POTRESNE MIZE ZA SIMULACIJO OBNAŠANJA KONSTRUKCIJ MED POTRESI

Mentor: doc. dr. Matjaž Dolšek  
Univerza v Ljubljani, Fakulteta za gradbeništvo  
in geodezijo

V diplomskem delu je obravnavano obnašanje konstrukcij med potresi s pomočjo šolske potresne mize. Glavni cilj naloge je bil usmerjen v pripravo različnih eksperimentov, ki so namenjeni izobraževanju bodočih inženirjev ter osveščanju širše javnosti o potresnem tveganju.

V eksperimentalnem delu naloge je opisan jeklen preizkušanelec, ki predstavlja trinadstropno stavbo. Lastnosti preizkušancea so takšne, da ustrezajo kapaciteti potresne mize, njegov odziv pa je dovolj nazoren za prikaz nekaterih fenomenov obnašanja konstrukcij med gibanjem tal. Posebej dobro so opisani eksperimenti, s katerimi so prikazani različne lastne nihajne oblike, pojav mehke etaže, torzijsko gibanje zaradi neenakomerno razporejene togosti ali mas po tlorisu konstrukcije, koncentracija potresnih sil v pritličju konstrukcije in odziv konstrukcij na različne potrese.

Opravljeni eksperimenti kažejo, da je šolska potresna miza zelo dober učni pripomoček, ki ob primerni uporabi pomaga pri boljšem razumevanju dinamičnega obnašanja gradbenih konstrukcij.

Diploma paper

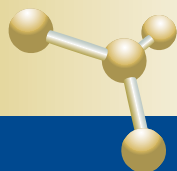
## THE USE OF AN INSTRUCTIONAL SHAKE TABLE FOR SIMULATING THE SEISMIC RESPONSE OF STRUCTURES

Mentor: Assistant Prof. Dr. Matjaž Dolšek  
University of Ljubljana, Faculty of Civil Engineering

The diploma paper examines the use of the instructional shake table for testing the behaviour of buildings during earthquake loading. The main goal of the diploma paper was to do different experiments to educate students and engineers to better understand the theoretical background of earthquakes.

In the experimental work a steel specimen, which symbolically represents a 3-storey building, was prepared. The specimen was designed to meet the seismic capacity of the table and to clearly present certain behavioural phenomena of structures during the ground movement. Different experiments with various forms of mode shapes were demonstrated; the soft storey effect, torsional behaviour, due to the stiffness, or mass irregularities, the concentration of seismic forces on the ground floor, and the response of structures to different earthquakes, were all carried out.

The experiments conducted show that the instructional shake table is a good educational tool which, when properly applied, helps in the understanding of the dynamic behaviour of structures.



Diplomsko delo

## AKTIVNI POČIVALNIK 1

**Mentor:** red. prof. Saša J. Maechtig  
**Somentorica:** dr. Metoda Dodič Fikfak, dr. med.  
Univerza v Ljubljani, Akademija za likovno  
umetnost in oblikovanje

Diplomsko delo je sestavljeno iz analitičnega in načrtovalskega dela. V analitičnem delu je avtorica raziskala uporabnika s psihofizičnega stališča; starost in spremembe v starosti, psihoanalizo starostnika, ergonomijo starostnika, telesno vadbo, rehabilitacijo v gerontologiji ter splošno zgradbo telesa.

Oporni element pri idejni zasnovi izdelka je analiza trga, ki definira naprave za razgibavanje in splošne rešitve počivalnikov. Analiza trga je razdeljena na dva dela zato, ker po do sedaj znanih podatkih na tržišču ni počivalnika, ki bi imel integrirane mehanizme za razgibavanje.

Načrtovalski del ima v začetku izhodiščne skice, nato opis materialov in končno rešitev.

Avtorica je oblikovala Aktivni počivalnik 1. Na podlagi vseh podatkov je nastala vadbena naprava, ki se skriva pod podobo počivalnika. Izdelek ima dve funkciji, počivanje in razgibavanje oziroma možnost telesne vadbe.

Izdelek je estetsko korekten, izžareva udobje, funkcionalnost, je anatomsko skladen, enostaven za uporabo, primeren s stališča ergonomije, praktičen in prilagodljiv posamezniku.

S počivalnikom avtorica poskuša starostnika spodbuditi k vadbi in s tem posledično prispevati k izboljšanju njegove vitalnosti.

Diploma paper

## ACTIVE LOUNGE CHAIR 1

**Mentor:** Prof. Saša J. Maechtig  
**Co-mentor:** Dr. Metoda Dodič Fikfak, PhD M.D.  
University of Ljubljana, Academy of Fine Arts and  
Design

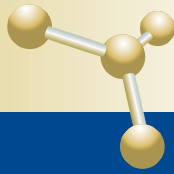
*This paper is composed of an analytical and practical part. In the first part the author has studied a user from the psycho-physical point of view; age, changes that occur with age, psychoanalysis of an elderly man, his ergonomics, physical training, rehabilitation in gerontology, and body structure. In order to make the concept of the product we have used an analysis of the market.*

*An analysis of the market is divided into two parts because the information gained so far shows that there is no lounge chair on the market that has integrated mechanisms for exercising.*

*The second part is composed of an initial sketch, the description of materials, and the suggested solution. The author has created the Active Lounge Chair 1. On the basis of data gathered a device was created that is hidden under the image of the lounge chair. Its two main functions are resting and exercising, or the possibility of body exercise.*

*The product is aesthetically correct, it emanates comfort, is functional, anatomically harmonious, easy to use, suitable from an ergonomic point of view, practical, and adaptable to anyone.*

*The author is trying to encourage elderly people to exercise and, consequently, to achieve greater vitality in old age.*



Diplomsko delo

## MODELIRANJE IN ANALIZA ELEKTROKEMIJSKIH SONČNIH CELIC

Mentor: prof. dr. Franc Smole  
Univerza v Ljubljani, Fakulteta za elektrotehniko

Elektrokemijske sončne celice so predstavnice nove, tretje generacije sončnih celic. Prednost tovrstnih celic je predvsem v enostavni in ceni tehnološki izdelavi, ki hkrati omogoča relativno visoke učinkovitosti pretvorbe sončne energije v električno. Princip delovanja elektrokemijskih sončnih celic je v osnovi podoben fotosintezi in se razlikuje od delovanja klasičnih anorganskih sončnih celic s p-n spojem.

V diplomskem delu je predstavljen razvoj matematičnega modela optoelektronskih lastnosti elektrokemijskih sončnih celic, ki je v drugem delu uporabljen za analizo njihovega delovanja. Model opisuje električne mehanizme delovanja in upošteva osnovne optične lastnosti celic. Struktura celice je predstavljena kot homogen medij, ki vključuje lastnosti nanoporoznega polprevodnika  $\text{TiO}_2$ , barvila za absorpcijo svetlobe in elektrolita za transport ionov. Tak pristop omogoča hitro in učinkovito analizo ter optimizacijo struktur celic. Model temelji na kontinuitetnih in transportnih enačbah za nosilce naboja, vpliv majhnega električnega polja pa je zanemarljiv. Kot prevladujoč izgubni mehanizem v celici so upoštevane rekombinacije elektronov med prevodnim pasom  $\text{TiO}_2$  in elektrolitom.

Postavljeni model elektrokemijske sončne celice predstavlja pomemben dosežek pri simuliranju in podrobnem razumevanju delovanja te prihajajoče tehnologije.

Diploma paper

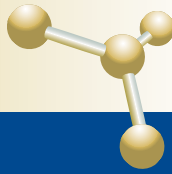
## MODELLING AND ANALYSIS OF DYE- SENSITIZED SOLAR CELLS

Mentor: Prof. Dr. Franc Smole  
University of Ljubljana, Faculty of Electrical Engineering

Dye-sensitized solar cells belong to the third generation of solar cells. The main advantage of these cells is simple and low cost manufacturing technology that enables relatively high conversion efficiencies of solar energy to electricity. The operating principle of dye-sensitized solar cells is similar to that of photosynthesis and differs significantly from conventional inorganic solar cells with a p-n junction.

In this diploma paper a development of a mathematical model of dye-sensitized solar cells is first presented. Then the model is then used to analyze and optimize the operation of the cells. Both the electrical and optical properties of solar cells are considered in the model. The cell structure is modelled as a homogenous medium consisting of a combination of a nano-porous  $\text{TiO}_2$  semi-conductor, a light-absorbing dye, and a redox electrolyte. This approach enables fast and effective analysis and optimization of cell structure. Continuity and transport equations are applied to all the charge carriers involved, while the small effects of an electric field are neglected. As a main loss mechanism in dye-sensitized solar cells, the recombination of electrons from the  $\text{TiO}_2$  conductive band to a redox electrolyte is considered.

The developed model of a dye-sensitized solar cell presents an important achievement in simulation, optimization, and understanding of inner processes in this emerging technology.



## Diplomsko delo

### TOVARNA KULTURE – REKONSTRUKCIJA STROJNICE TOVARNE SLADKORJA “DIMITRIJE TUČOVIĆ”, BEOGRAD

Mentor: doc. mag. Vladimir Milenković, arh.  
Somentorja: dr. Branislav Žegarac, arh.,  
doc. mag. Ksenija Lalović, arh.  
Univerza v Beogradu, Fakulteta za arhitekturo

Diplomsko delo obravnava možnost revitalizacije industrijskega objekta, značilnega za obdobje med obema vojnama. Objekt je v osnovi delikaten tako po svoji poziciji kot po likovnosti arhitekturne kompozicije. Lokacija intervencije je obogatena z bližino savskega jezera in športnega centra Ada Ciganlija, Košutnika in hipodroma.

Avtorica se dotika tehničnih področij, pri čemer se ne zadovolji zgolj z navajanjem, ampak se spusti tudi v konkretno reševanje. Pomanjkanje referenčnih primerov avtorica spretno nadomesti z nadpovprečno detajliranimi, čistimi idejnimi risbami arhitekture. Organizacija je uporabniško smiselna, se programsko ne negira in vključuje moderne materiale z moderno oblikovanimi vsadki. Forma ostaja nedotaknjena, njena arhitekturna vrednost pa se poveča.

V smislu polivalentnosti je intervencija vsekakor sodobna. Veliki odprti prostori delujejo kot programski reciklaž, ki primarno dodeljeni funkciji dodaja vedno nove uporabne vrednosti. Intervencija bo v prostoru delovala kot referenca ostalim projektom, ki še čakajo na posege. Jeklo je s svojo tehnološko formo, vitkostjo in nosilnostjo najprimernejši material za aplikacijo pri tovrstnih posegih in je v nalogi dosledno uporabljeno.

Rešitev je dobra osnova za nadaljnje projektiranje podobnih kompozicij. Ugotovitve in rezultati, do katerih je prišla avtorica, kažejo, da je rešitev uporabna ter zanimiva.

## Diploma paper

### THE FACTORY OF CULTURE - RECONSTRUCTION OF THE MACHINE HALL OF THE SUGAR FACTORY “DIMITRIJE TUČOVIĆ”, BELGRADE

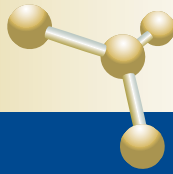
Mentor: Assistant Prof. Vladimir Milenković,  
MSc (Architecture)  
Co-Mentor: Dr. Branislav Žegarac, Architecture;  
Assistant Prof. Ksenija Lalovic, MSc (Architecture)  
University of Belgrade, Faculty of Architecture

*This diploma paper discusses the possible renovation of an industrial building from the period between World War I and World War II. This is a sensitive project, not only due to its location, but also due to the artistic architectural composition. The location of the building is complemented by the proximity of the Sava lake and the sports centre, Ada Ciganlija, Košutnik, and the racetrack complex.*

*The author discusses technical areas - not by merely listing them, but by also providing actual solutions. The lack of reference examples is skilfully substituted by an above-average amount of detailed, clear sketches, of architectural ideas. The paper is organised in a logical manner, and the scheme is not contradictory, it includes modern materials with modern designed attachments. The form remains untouched; its architectural value rises increasingly.*

*From the polyvalent point of view this intervention is definitely modern. The large open spaces serve as a recycled scheme; and new, useful functions are added to the initial purpose of the building. In its surroundings, the intervention will be seen as a referral for other projects awaiting renovation. Steel is the most appropriate choice of material in these type of procedures, due to its technological form, thinness, and load-bearing capacity and it is used consistently in this paper.*

*The solution serves as a good platform for further design of similar compositions. The findings and results gained by the author during the research show that the solution is useful and interesting.*



Diplomsko delo

## UVEDBA CE OZNAČEVANJA IZOLACIJSKIH PANELOV IN SAMONOSILNE PLOČEVINE

Mentor: višji pred. dr. Gaber Begeš,  
univ. dipl. inž. el.  
Univerza v Ljubljani, Fakulteta za elektrotehniko

Diplomsko delo opisuje zahteve in postopke za CE označevanje izolacijskih kovinsko oplášenih panelov in samonosilne pločevine. Podatki so predstavljeni v skladu z direktivo o gradbenih proizvodih CPD (89/106/EEC - Pravilnik o potrjevanju skladnosti in označevanju gradbenih proizvodov, Ur. list RS, št. 54/01) ter s standardom SIST EN 14782:2006 za samonosilne pločevine in SIST EN 14509:2006 za izolacijske panele.

V diplomskem delu je problematika CE označevanja predstavljena s konkretno rešitvijo, in sicer zaradi boljše preglednosti samo za eno skupino proizvodov (imenovano Trimoterm CE1). Opisan je splošni postopek vpeljave CE oznake za izolacijske panele in samonosilne pločevine in predstavljene so zahteve, ki jih mora izpolniti proizvajalec.

V zaključnem delu naloge je predstavljen postopek pritrditve CE oznake na končen proizvod, ki je izveden s pomočjo informacijskega sistema SAP.

Avtor na koncu diplomskega dela poda ugotovitve in možne izboljšave.

Diploma paper

## INTRODUCTION OF THE CE MARKING OF INSULATING PANELS AND SELF-SUPPORTING SHEET METAL

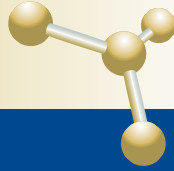
Mentor: Senior lecturer Dr. Gaber Begeš,  
BSc (Electrical Eng.)  
University of Ljubljana, Faculty of Electrical  
Engineering

Procedures and demands with regards to the CE marking of »Self-supporting, double-skin, metal-faced insulating panels« are presented in this diploma paper, as well as for Self Supported Corrugated steel sheet CE marking. Data is introduced in accordance with the Construction Products Directive CPD (89/106/EEC), Standard SIST EN 14782:2006 for corrugated steel-sheet and standard SIST EN 14509:2006 for sandwich panels.

In the main part of the diploma paper, the CE marking Issue is highlighted using an exact example and solution. One Product group (Trimoterm CE1) is used as an example. General procedural demands, and the demands of the Producer's needs to fulfill, are presented. The data found in tables is adjusted according to the demands of the standard.

In the end, a procedure for putting the label into end-product packages, is presented. A label is generated automatically by the Enterprise Resource Planning system, SAP.

Further work and possible improvements are also suggested.



**SIMON KULOVEC**

Diplomsko delo

## PARAMETRIČEN MODEL KONIČNE VOZLIŠČNE STRUKTURE PROSTIH OBLIK FASAD

Mentor: prof. dr. Jožef Duhovnik, univ. dipl. inž.  
Univerza v Ljubljani, Fakulteta za strojništvo

Vodilo naloge je razvoj modela konične vozliščne strukture pri zasnovi in izdelavi fasad prostih površin.

Tematika je v arhitekturi in posledično gradbeništvu zelo sodobne narave, njen potencial v zadnjih letih skokovito narašča. Rešitve mreženja površin za poljubne oblike namreč niso poljubne, hkrati pa s kvalitativnega in kvantitativnega vidika bistveno prezahtevne za reševanje zgolj z znanjem ekspertov. Za to so potrebna CAD orodja.

Predstavljena naloga pomeni osnovo znanja za parametričen opis nastalega geometričnega in nosilnega problema, ki ga srečamo v vozliščnih konstrukcij prostih površin. Predstavljen je širši nabor možnih konstrukcijskih rešitev, ki so ocenjene s pomočjo morfološke analize, s čimer se nabor rešitev zoži. Izbrano rešitev avtor optimira in pokaže uporabnost razvitega modela. Za celotno konstrukcijo testnega primera objekta se privzame uporabljena rešitev, izdala se CAD model, določi statika in na osnovi slednje se dimenzionira vozliščni detajl konstrukcije. Rešitev avtor integrira v CAD modelirnik in s tem dokaže širšo uporabnost razvitega modela.

Diploma paper

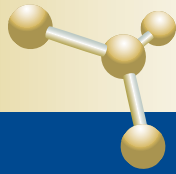
## PARAMETRIC CONICAL VERTEX GENERATION FOR FREE-FORM ARCHITECTURAL DESIGN

Mentor: Prof. Dr. Jožef Duhovnik, BSc (Electrical Eng.)  
University of Ljubljana, Faculty of Mechanical Engineering

The paper was driven by developing a model of conical vertex in designing and implementing free-form façades.

This is a current topic in architecture and consequently also in construction. Its potential has been increasing in the last few years. Solutions including netting surfaces for optional forms are not popular and they are also too demanding regarding quality and quantity to be solved with mere professional knowledge. That is why CAD tools are necessary.

This paper presents the basics in parametric description of the formatted geometric and load-bearing problems we encounter in vertexes of freeform constructions. A wider range of possible construction solutions are presented; they are reviewed with the help of morphologic analyses, which helps narrow down the possible range of solutions. The author optimises the chosen solution and presents the usefulness of the developed model for the complete construction of the building test example. The solution is adapted for the building, a CAD model is constructed, a statics analysis is made, and the dimensions of the vertex detail of the construction are made based on the analysis. The author integrates the solution into the CAD model and, thereby, proves that the model can be used in a more general way.



Diplomsko delo

## UPORABA TRIMO PROIZVODOV V STANOVANJSKI GRADNJI

Mentor: prof. dr. Janez Kresal, univ. dipl. inž. arh. Univerza v Ljubljani, Fakulteta za arhitekturo

Trimo ponuja celovite rešitve na področju jeklenih konstrukcij, fasadnih in strešnih panelov.

Diplomsko delo kaže, da je s tovrstno tehnologijo in produkti možno graditi montažno stanovanjsko arhitekturo s proizvodi, prilagojenimi stanovanjski gradnji. Montažna stanovanjska gradnja ponuja hitro zgrajen nov dom in omogoča možnost selitve. Prilagaja se s svojo modularnostjo in je ekološka z masovno prefabrikacijo. Takšna gradnja odgovarja na zahteve sodobnega trenda bivanja, ki ji v razvitem svetu posvečajo veliko razvojne pozornosti.

Šest različno načrtovanih hiš upošteva oblikovalske smernice tovrstne tehnologije, ki blesti predvsem v ravnih linijah, v igri odvzemanja in dodajanja kubicov in prepletanju različnih gradiv.

Različica hiš dokazuje, da je s Trimo proizvodi mogoče zgraditi unikatno stanovanjsko gradnjo, ki je po funkcionalnosti in ugodnem bivanju primerljiva s klasičnimi hišami.

Diploma paper

## INCORPORATION OF TRIMO PRODUCTS INTO HOUSING CONSTRUCTION

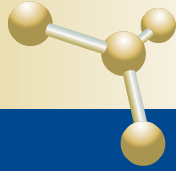
Mentor: Prof. Dr. Janez Kresal, BSc (Architecture) University of Ljubljana, Faculty of Architecture

Trimo offers complete solutions in the area of steel constructions, façades, and roof panels.

This diploma paper shows that with these kinds of technology and products it is possible to build pre-fabricated housing architecture by using products which are adjusted to housing building. It offers a new home in a short period of time and enables people to move in. It adjusts by its modularity and it is ecological suitable for mass pre-fabrication. This kind of construction responds to the demands of the modern trends of living, which now get a lot of developmental attention.

Six differently designed houses abide by the designing guidelines of this kind of technology, which is shown at it's best mostly in straight lines, and with taking and adding cubes and interlacing different materials.

This version of houses proves that it is possible to build a unique housing construction with Trimo products and that this house is comparable to classic houses in functionality and suitability for living.



Diplomsko delo

## NUDISTIČNA PLAŽA (FKK)

Mentor: József Koller, univ. dipl. inž. arh.  
Somentorja: dr. Krisztián Kovács - Andor, univ.  
dipl. inž. arh., Zoltán Bánfalvi, univ. dipl. inž. arh.  
Univerza v Pecu - PMMK

Avtor v diplomskem delu z naslovom »Nudistična plaža – FKK« obravnava lokacijo, ki se nahaja ob jezeru Velence na Madžarskem.

Stavba, ki je del programa nudistične plaže, se s svojo zasnovo in z uporabljenimi materiali skuša zlititi z okolico. Dvignjena nad tlemi je vidna z vseh zornih kotov in poudarja avtorjev oblikovni koncept.

Avtor oblikuje stavbo z vsemi načeli trajnostne gradnje: z upoštevanjem naravnih danosti prostora, s prilagajanjem klimatskim pogojem, z uporabo obnovljivih virov energije, z uporabo naravnih materialov – lesa – in s principom hitre izvedbe oz. postavitve objekta.

Diploma paper

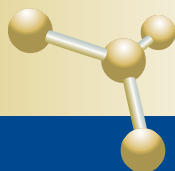
## NUDIST BEACH (FKK)

Mentor: József Koller, BSc (Architecture)  
Co-mentors: Dr. Krisztián Kovács - Andor, BSc  
(Architecture), Zoltán Bánfalvi, BSc (Architecture)  
University of Pecs - PMMK

*The author of the diploma paper "Nudist beach-FKK" addresses the location situated by Lake Venice in Hungary.*

*The building structure, which is part of the nudist beach, tries to be in full harmony with its surroundings with its unique design and the materials used. The building suspended in air is visible from all angles which emphasizes the author's conceptual design.*

*The architect's necessity was to think of the environment and in the search for solutions he utilized all the principles of sustainable construction. Adaptation to climatic conditions, usage of renewable energies, environmentally friendly materials, and rapid implementation which can be accomplished with little field work, are all important aspects of today's designs.*



Diplomsko delo

## PRIMERJAVA KOMPETENC TRANSFORMACIJSKIH VODIJ V PROIZVODNIH IN NEPROIZVODNIH PODJETJIH

Mentor: doc. dr. Miha Škerlavaj  
Univerza v Ljubljani, Ekonomska fakulteta

V teoretičnem delu so opisani teorija izmenjave vodja-sledilec ter razvoj te teorije, kontingenčni pristopi k vodenju ter transformacijsko vodenje.

Empirični del obravnava pilotsko raziskavo organizacijske kulture, ki jo je izvedlo podjetje O.K. Consulting, d. o. o., predvsem drugi del vprašalnika, ki se nanaša na sloge vodenja in kompetence transformacijskih vodij. Avtorica ugotavlja, ali so razlike v kompetencah transformacijskih vodij statistično značilne ali ne.

Osredotočena na šest kompetenc transformacijskega vodenja, in sicer na vzornišvo, vizionarstvo, spodbujanje različnih mnenj, vključevanje v odločanje, postavljanje izzivov in osmišljanje.

Avtorica je z raziskavo želela ugotoviti, ali so si vodje v proizvodnih in neproizvodnih podjetjih v svojih kompetencah podobni oziroma različni. Dokazala je, da se kompetence razlikujejo. Razlike so bile statistično značilne za vse kompetence, poleg tega pa so bile statistično značilne tudi pri sedemindvajsetih od trintridesetih postavk vprašalnika.

V sklepu diplomskega dela je avtorica podala predloge za nadaljnje raziskave na področju transformacijskega vodenja oziroma kompetenc transformacijskih vodij.

Diploma paper

## COMPARISON OF THE COMPETENCIES OF TRANSFORMATIONAL LEADERS IN MANUFACTURING AND NON-MANUFACTURING COMPANIES

Mentor: Assistant Prof. Dr. Miha Škerlavaj  
University of Ljubljana, Faculty of Economics

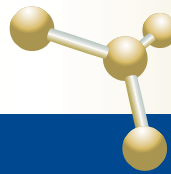
The theoretical part describes the development of the theory of exchange (leader-follower), contingency attitudes to leadership, and the transformational style of leadership.

In the empirical part the author focuses on a pilot survey of the organizational culture, carried out by the company O.K. Consulting d.o.o., especially on the second part of the questionnaire relating to the leadership styles and competencies of transformation leaders, and considers whether differences in the competencies of transformational leaders is statistically significant, or not.

The author focuses on six competencies of transformation leaders: on modelling, vision, encouragement, enabling, challenging, and making sense.

The survey seeks to discover whether leaders in manufacturing and non-manufacturing companies have similar, or different, competencies. The differences were statistically significant for all competencies; in addition, the differences were statistically significant even in 27 of the 33 items in the questionnaire.

In the conclusion of the diploma paper the author makes suggestions for further research on transformational leadership and the transformational competencies of leaders.



Diplomsko delo

## PROJEKT JEKLENE INDUSTRIJSKE HALE Z DVEMA ŽERJAVNIMA PROGAMA

Mentor: prof. dr. Darko Beg, univ. dipl. inž. grad.  
Somentor: asist. dr. Peter Skuber, univ. dipl. inž. grad.  
Univerza v Ljubljani, Fakulteta za gradbeništvo  
in geodezijo

Diplomsko delo obravnava projektiranje jeklene  
industrijske hale z dvema mostnima žerjavoma.

Prvi del obsega projektiranje žerjava. Določeni  
so vplivi mostnega žerjava na nosilec žerjavne  
proge v skladu s SIST EN 1991-3. Narejena je  
statična analiza, ki zajema projektiranje žerjavne  
proge v skladu s SIST EN 1993-6. Narejene so  
dodatne kontrole lokalnih napetosti zaradi vnosa  
koncentrirane obtežbe v nosilec žerjavne proge.  
Izračunani so tudi montažni spoji nosilca v polju.

V drugem delu naloge so določene obtežbe, ki  
poleg obtežbe mostnega žerjava delujejo na glavno  
konstrukcijo hale. Narejena je statična analiza  
z upoštevanjem začetne globalne geometrijske  
nepopolnosti in vplivov teorije drugega reda.  
Določeni so vsi elementi nosilne konstrukcije,  
podkonstrukcije fasade in strešnih panelov, prav  
tako pa so izračunani značilni spoji. Izdelani so  
pozicijski načrti in narisani glavni detajli.

V zadnjem delu naloge je določen vpliv hale  
na temeljna tla, določene so dimenzije temelja,  
izračunan pa je tudi sam detajl priključka na  
temelj.

Diploma paper

## STEEL DESIGN OF AN INDUSTRIAL BUILDING WITH TWO CRANE SUPPORTING STRUCTURES

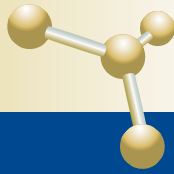
Mentor : Prof. Dr. Darko Beg, BSc (Civil Engineering)  
Co-mentor : Assisatnt Dr. Peter Skuber, BSc (Civil  
Engineering)  
University of Ljubljana, Faculty of Civil and Geodetic  
Engineering

The design of a steel industrial building with two crane  
structures is presented.

The first part of work is devoted to the crane design.  
Actions induced by cranes are defined according  
to standard SIST EN 1991-3. The analysis of the  
crane supporting structure is made in accordance  
with standard SIST EN 1993-6. The design includes  
local stress control, fatigue check for the relevant  
details, and design of typical connections in the crane  
supporting structure.

Actions induced by cranes and other loads, which are  
important for the building design, are defined in the  
second part of the work. The global elastic analysis  
with initial overall geometric imperfection and the  
second-order theory effect, is used for the calculation  
of internal forces and displacements. Strength and  
stability control for all structural elements is made.  
Deflections are checked in the service-ability limit  
states.

Typical connections are calculated and the foundations  
are defined. The structure is presented with the overall  
drafts and typical details of the structure are plotted.



Diplomsko delo

## MODULNI VPENJALNI PRIPOMOČKI ZA IZDELAVO ZAHTEVNIH PROSTORSKIH DELOV

Mentor: prof. dr. Branko Tadić  
Somentorja: doc. dr. Slobodan Mitrović,  
doc. dr. Milan Erić  
Univerza v Kragujevcu, Fakulteta za strojništvo

Vpenjalni pripomočki so pomemben del procesa obdelave ali sestave v maloserijski ali velikoserijski proizvodnji, zato se vse več pozornosti posveča projektiranju tehnoloških procesov in konstruiranju primernih vpenjalnih sistemov, saj predstavljajo možnosti za skrajševanje proizvodnih procesov in zniževanje stroškov proizvodnje.

Na tržišču je mogoče dobiti veliko posameznih vpenjalnih elementov, katere pa je za kompleksne operacije potrebno ustrezno prilagoditi in sestaviti v večje sisteme.

Diplomsko delo obravnava realizacijo kompleksnega modulnega vpenjalnega sistema ob uporabi primernih vpenjalnih elementov, povezanih med seboj na osnovni plošči. Tak način gradnje zahtevnih vpenjalnih sistemov s pomočjo manjših fleksibilnih gradnikov omogoča cenejšo izvedbo, krajši čas realizacije vpenjala in krajši čas do začetka proizvodnje. Istočasno pa omogoča študijo možnosti kompleksnejših vpenjalnih sistemov za velikoserijsko proizvodnjo.

V okviru diplomskega dela je bilo izvedeno tudi 3D modeliranje elementov modulnega vpenjalnega sistema za izdelavo karoserijskih delov s postopkom varjenja ter vpenjalna naprava za konkreten primer izdelave vrat kamiona.

Predstavljeno delo podaja pristop konstruiranja modulnih vpenjalnih pripomočkov v obliki knjižnic elementov, ki se lahko uporabijo pri konstruiranju drugih podobnih priprav, ter s tem sledi trendom v sodobni strojogradnji s ciljem stalnega izboljševanja obstoječih priprav, podpora inovativnim rešitvam in zniževanju stroškov izvedbe.

Diploma paper

## MODULAR AFFIXING TOOLS FOR IMPLEMENTATION OF THE DEMANDING PARTS OF SPACE

Mentor: Prof. Dr. Branko Tadić  
Co-mentors: Assistant Prof. Dr. Slobodan Mitrović,  
Assistant Prof. Dr. Milan Erić  
University of Kragujevac, Faculty for Mechanical  
Engineering

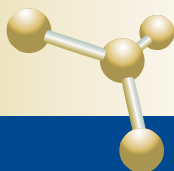
*Affixing tools are an important part of processing or assembly in small-scale or large-scale production and that is why more attention is paid to designing technologic processes and construction OF adequate affixing systems. They present a possibility of reducing production processes and production costs.*

*There are many individual affixing elements available on the market, but they need to be adjusted accordingly for complex operations and built into larger systems.*

*This diploma paper discusses the completion of a complex modular affixing system using adequate affixing elements connected together on the base plate. This construction method for demanding affixing systems using smaller flexible construction parts enables a more cost-effective implementation, faster completion of the affixing tool, and a faster production start. It also enables studying the possibilities of more complex affixing systems for large-scale production.*

*A 3D modelling of modular affixing system elements was made for this paper. It serves for implementation of parts of the bodywork using a welding procedure, and an affixing machine for a real example of producing a lorry door.*

*This paper presents an approach of constituting modular affixing tools in the form of libraries of elements that can be used in constituting other similar devices. Trends in modern machine construction are observed this way with the goal of constant improvement of existing devices to support innovative solutions and reduce costs in implementation.*



Diplomsko delo

## ŠPORTNA DVORANA IN MODEL PROSTORSKO-PROGRAMSKIH RAZŠIRITEV IZOBRAŽEVALNIH INŠTITUCIJ V SREDIŠČU MESTA BEOGRAD

Mentor: doc. mag. Vladimir Milenković,  
univ. dipl. inž. arh.  
Univerza v Beogradu, Fakulteta za arhitekturo

Projekt z naslovom Športna dvorana in model prostorsko-programskih razširitev izobraževalnih inštitucij v središču mesta Beograd opozarja na primanjkovanje športnih programov v obstoječih izobraževalnih inštitucijah mesta Beograd.

Avtorica v nalogi postavlja strategijo kje in kako bi se športni programi lahko implementirali v urbanem okolju. Arhitekturno rešitev išče v treh različnih pristopih:

1. z umeščanjem programa v obstoječo strukturo pod spomeniškim varstvom,
2. z umeščanjem programa kot nadgradnjo,
3. z umeščanjem programa v novogradnjo.

Diplomsko delo arhitektke Ivane Popović prikazuje nove prostorske koncepte umestitve športnih programov v urbano strukturo in se s tematiko direktno navezuje na področno aktivnost podjetja Trimo.

Diploma paper

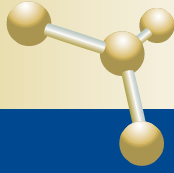
## GYM PLUS - MODELS OF SPATIAL AND PROGRAMME EXTENSIONS FOR EDUCATIONAL FACILITIES IN THE CENTRAL ZONE OF BELGRADE

Mentor: Assistant Prof. Vladimir Milenković,  
MSc (Architecture)  
University of Belgrade, Faculty of Architecture

Project »Gym Plus - Models of spatial and programme extensions for educational facilities in the central zone of Belgrade« tackles the problem of the lack of facilities for physical education in Belgrade schools.

The architectural proposal consists of three case studies for different urban and architectural solutions. The model »Below« is a study of mimicry, of a discreet approach to dense and, sometimes, heritage-protected ensembles; the model »Above« is a study of a roof extension, while the model »Free« can be seen as a study of densification - an example of detached solutions within an urban area.

The modern approach of the architect Ivana Popović's diploma paper broadens the horizon of the already active architectural field of the Trimo Company.



Diplomsko delo

## RAZVOJ NOVE STORITVE PO D.SCHOOL METODOLOGIJI: PRIMER PODJETJA E-STORITVE, D. O. O.

Mentor: doc. dr. Igor Prodan  
Univerza v Ljubljani, Ekonomska fakulteta

V diplomskem delu je bila s pomočjo d.School metodologije, posebnega pristopa kreativnega iskanja rešitev, ideja razvita v poslovno priložnost, ki je bila preverjena še s tradicionalnim poslovnim načrtom.

Obravnavan je bil trg storitev, pri katerem velik problem predstavljata neobvladljivost in neorganiziranost zaradi informacijske zasičenosti. Trg storitev je bil tako približan končnemu uporabniku s ciljem poenostaviti iskanje pravega ponudnika storitev.

Pri oblikovanju poslovne priložnosti je bil uporabljen dizajnerski načina razmišljanja, ki inovacijsko aktivnost gradi na osnovi vzorcev obnašanja družbe (kaj ljudje resnično hočejo, kaj potrebujejo), v središče proučevanja postavi posameznika, s svojimi metodami in odprtim zaznavanjem sveta pa poskuša uskladiti družbene potrebe s tehnološko izvedljivostjo tako, da poslovna strategija to povezavo lahko preoblikuje v kupno moč in priložnost na trgih.

V predstavljenem delu izstopata predvsem inovativni pristop k reševanju problemov ter visoka kakovost predstavljenega referenčnega primera.

Diploma paper

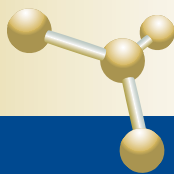
## DEVELOPMENT OF A NEW SERVICE ACCORDING TO THE D.SCHOOL METHODOLOGY: CASE STUDY OF THE E-STORITVE, D.O.O. COMPANY

Mentor: Assistant Prof. Dr. Igor Prodan  
University of Ljubljana, Faculty of Economics

The diploma paper presents d.School methodology, a special approach to creative problem solving, to develop an idea into a business opportunity and test it with a traditional business plan. It is focused on the service market, which is dis-organized and difficult to manage, due to being saturated with information. It brings the service market closer to the end-user, and simplifies the search for an appropriate service provider.

When forming a business opportunity "design thinking" has been utilized, which builds innovation activity on the basis of behavior patterns in society (what people really want and need in their lives), places the individual as the focus of the study, and uses the methods and designer's sensibilities to match people's needs with what is technologically feasible and what business strategy can convert into customer value and market opportunity.

Overall design thinking improves consumer experience.



PETER PRINČIČ

Diplomsko delo

## REINTERPRETACIJA STANOVANJSKEGA STOLPIČA ZA DANAŠNJE POTREBE

Mentor: prof. dr. Mario Perossa, univ. dipl. inž. arh. Univerza v Ljubljani, Fakulteta za arhitekturo

Varčevalni ukrepi pri energiji usmerjajo zasnovo večstanovanjskih stavb h kompaktnim točkovnim objektom z boljšim izkoristkom prostornine v razmerju z ovojem.

Stanovanjski stolpič je lahko ponovno obujen arhitekturno tipološki prispevek k reševanju današnjih stanovanjskih, energetske ekonomskih in bivalnih razmer. Ta stavbni tip se obravnava kot sistem: danes izginjajo meje med merili stanovanja, stanovanjsko stavbo in stanovanjskih okoljem. Ta tipologija pa lahko obvlada vse nivoje, lahko se vključi praktično v vsakršno situacijo, in sicer z lastnostmi točkovnosti objekta, s konstrukcijskim sistemom, ki omogoča fleksibilnost, in z ovojem stavbe.

Diplomsko delo je tudi razmislek o personalizaciji gradbenega industrijskega procesa. Če so vse stavbne površine človekova »tretja koža«, naj ima stranka možnost vpliva na izgled svojega okolja. Projekt je zamišljen deloma kot kataloška zbirka ponujenih tipov sestavljivih stanovanj in fasadnih ovojev.

Diploma paper

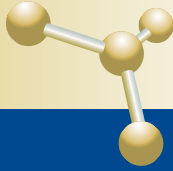
## REINTERPRETATION OF RESIDENTIAL BLOCK FOR TODAY'S NEEDS

Mentor: Prof. Dr. Mario Perossa, BSc (Architecture) University of Ljubljana, Faculty of Architecture

Energy saving politics are re-directing the development of residential buildings towards a more compact system which enables more profitable use of space, in regard to the building envelope.

A residential block becomes a representative typological solution that is an answer to current the economical, ecological, and housing requirements. This type of housing is regarded as a system. Today, the borders between the criteria for apartments, residential buildings, and a housing environment, are diminishing. The proposed typology with its constructional system that enables flexibility and different types of building envelopes, envelops it all.

This diploma paper points out an interesting approach: the personalization of an industrial process. The final architectural project is partly defined as a catalogue collection of combined apartments and their building envelopes.



Diplomsko delo

## IZZIVI NEIZKUŠENIH SAMOVODENIH TIMOV NA POTI DO VISOKE UČINKOVITOSTI

Mentor: doc. dr. Robert Kaše  
Somentor: prof. John Phelan  
Univerza v Ljubljani, Ekonomska fakulteta

Visoko uspešen tim je tisti tim, ki je bolj učinkovit in produktiven kot kateri koli drug tip tima. Tak tim nima uradnega vodje, ima uveljavljene norme, cilje, vsi člani se strinjajo s poslanstvom tima. Ima tudi druge izstopajoče karakteristike: zaupanje med člani tima, sprotno reševanje konfliktov, predanost in prevzemanje odgovornosti članov tima za doseganje rezultatov. Zaradi teh lastnosti visoko uspešen tim dosega izjemne rezultate.

Avtorica je v raziskavi ugotovila, da se timi na poti do visoke uspešnosti srečujejo z določenimi težavami. Identificirala je najpogostejše težave, s katerimi se srečujejo samovodeni timi, čeprav je njihova sestava brez napak in delujejo v okolju, kjer imajo potrebno podporo organizacije. Ponudila je koristen vpogled v te težave in nasvete za upravljanje timov, da bodo dosegli stanje visoke uspešnosti. Z upoštevanjem v raziskavi navedenih nasvetov se lahko število timov, ki jim pri njihovem delovanju spodleti, drastično zmanjša.

Nespoštovanje med člani tima, nejasni cilji in norme, neučinkoviti sistemi za odločanje, neproduktivni sestanki, neučinkoviti sistemi upravljanja uspešnosti in izgubljanje časa zaradi izgovorov so le nekatere izmed težav, s katerimi se timi srečujejo. Vse te težave se lahko preprečijo ali odpravijo.

Diploma paper

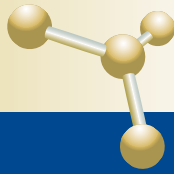
## CHALLENGES TO AN INEXPERIENCED, SELF-MANAGING, TEAMS ON THEIR WAY TO HIGH PERFORMANCE

Mentor: Assistant Prof. Dr. Robert Kaše  
Co-mentor: Prof. John Phelan  
University of Ljubljana, Faculty of Economics

*A high performance team is one which is more efficient and productive than any other type of team. This team has no official leader. It has established norms, and goals, and everyone is in agreement about the mission statement. It also has some outstanding characteristics, such as trust between team members, team members that solve conflicts as they occur, a shared commitment, and all members accountable for results. Because of this, high-performance teams deliver outstanding results.*

*The author observed a team and identified common challenges that teams face in the process of becoming a high-performance team, even when their composition is flawless, and they have a supportive organizational environment. The goal was to offer useful insights into how the team can be managed so it reaches a state of high-performance. By using and respecting the given guidelines the number of teams that fail can be dramatically reduced.*

*Challenges such as trouble with lack of respect, having unclear goals and norms, having an ineffective decision-making process, unproductive meetings, not having an efficient and beneficial performance management system, and spending time on creating excuses - are only a few of the challenges that teams face. All of them are preventable and manageable.*



Diplomsko delo

## MIKROVALOVNO SUŠENJE IZOLACIJSKIH PLOŠČ NA OSNOVI PERLITA

Mentor: prof. dr. Igor Plazl  
Univerza v Ljubljani, Fakulteta za kemijo in  
kemijsko tehnologijo

Diplomsko delo preučuje proces sušenja visoko porozne termoizolacijske plošče na bazi ekspanziranega perlita s pomočjo mikrovalov.

Avtorica izpostavi problem nehomogene porazdelitve jakosti elektromagnetnega polja znotraj mikrovalovne komore in pojav slabjenja jakosti mikrovalov na določenem mestu ob penetraciji v globino sušечеlega se materiala.

Za opis sistema uporabi fenomenološki matematični model, ki vpliv mikrovalovnega polja opiše s členom generiranja toplote v omejenem volumskem elementu. Problem je rešen v smeri ene, najtanjše dimenzije in eksperimentalno potrjen tako z meritvami temperature kot s primerjanjem napovedane in realne hitrosti sušenja vzorčne plošče.

Model s pripadajočimi koeficienti in poenostavitvami lahko, zaradi direktnega in smiselno poenostavljenega pristopa, služi kot odlična podlaga za napoved hitrosti sušenja in temperaturnih porazdelitev za večino procesov, ki zaradi svojih specifik zahtevajo uporabo mikrovalovne tehnologije.

Diploma paper

## MICROWAVE DRYING OF ISOLATING PLATES BASED ON PERLITE

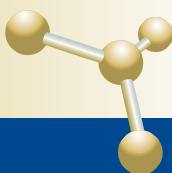
Mentor: Prof. Dr. Igor Plazl  
University of Ljubljana, Faculty of chemistry and  
chemical technology

*This diploma paper describes the drying process of highly porous, thermal insulation board based on expanded perlite, by using microwave energy.*

*Specific problems connected with microwaves are described and taken into account: the non-homogeneous distribution of the electromagnetic field inside the microwave cavity, the energy decay of microwaves, and penetrating to the core of the object being dried.*

*A phenomenological mathematical model with an internal heat generation part is used and solved in one dimension. Results are verified by temperature measurements inside the dried board, and by comparing the model proposed and the experimentally obtained drying rate.*

*With its direct and reasonably simplified approach, the mathematical model can easily be used to describe most cases that include microwave drying.*



Diplomsko delo

## BIVAKI KOT DEL TURISTIČNE INFRASTRUKTURE

Mentor: prof. mag. Peter Gabrijelčič,  
univ. dipl. inž. arh.  
Somentorica: doc. dr. Alenka Fikfak,  
univ. dipl. inž. arh.  
Univerza v Ljubljani, Fakulteta za arhitekturo

Diplomsko delo obravnava prostorski vidik snovanja turističnega omrežja. Omrežje se navezuje na obstoječo že delujočo turistično infrastrukturo okolice Postojne.

Delo se odlikuje po obsežnih preglednicah prednosti, slabosti in priložnosti posamezne razvojne strategije regije. Kulturna krajina, turistična ponudba regije in raba so zelo obsežno analizirane, kar avtor spretno uporabi v prid kvalitete končne aplikacije. Značilnost avtorjevih bivakov je kulturno vklapljanje v naravno okolje in sistemsko zastavljen sestav funkcionalnih enot.

Bivaki v Sloveniji ne služijo zgolj planincem in pohodnikom, ampak tudi gorskim reševalcem, zaradi česar so skorajda neprecenljivi. Pojem modularne zasnove bivakov v sebi skriva veliko prednosti. V svoji konstrukcijski zasnovi so izredno enostavni, predpripravljeni, sestavljivi in s tem cenovno dostopnejši.

V arhitekturi je modularnost vsekakor močno prisotna, saj ideja množenja osnovne bivalne ali funkcionalne enote privede do neskončne, vedno zanimive strukture, ki se lahko odziva na danosti okolja. Način vrednotenja in kreiranja je vsekakor vreden posnemanja.

Naloga v delu aplikacije znanstvenih dognanj v celoti posega v sfero dejavnosti podjetja Trimo, poleg tega pa je rešitev uporabna ter zanimiva tudi širše.

Diploma paper

## BIVOUACS AS PART OF TOURISM INFRASTRUCTURE

Mentor: Prof. Peter Gabrijelčič,  
MSc (Architecture)  
Co-mentor: Assistant Prof. Dr. Alenka Fikfak,  
BSc (Architecture)  
University of Ljubljana, Faculty of Architecture

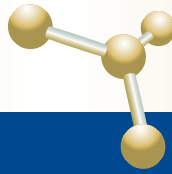
*This diploma paper focuses on the issue of space in designing a tourist network. This network is connected with the existing and operating tourist infrastructure around Postojna.*

*The paper excels in the extensive tables on advantages, disadvantages, and opportunities for individual development strategies of the region. The cultural landscape, the tourist offer of the region, and usage is analysed extensively, which contributes to the quality of the final application. The characteristics of the author's bivouacs are a cultural adaptation into the natural environment and a systematically outlined construction of functional units.*

*Bivouacs in Slovenia are not merely used by rock-climbers or hikers; they are also used by mountain rescue teams, which makes them almost invaluable. The concept of modular bivouac design holds many advantages. They have a simple construction, are pre-prepared, can be assembled easily, and they are cost-effective.*

*Modular units present a large part of architecture as the idea of addition to the basic accommodation or functional unit brings endless, interesting structures that respond to its surroundings. This evaluation and creation is definitely worth imitating.*

*The scientific findings discussed in the paper completely correspond with Trimo's range of operations, but the solution is also interesting and useful in a more general sense.*



Diplomsko delo

## CELOVITO OBVLADOVANJE OKOLJSKIH STROŠKOV V PODJETJU X, D. D.

**Mentorica:** dr. Bojana Korošec  
Univerza v Mariboru, Ekonomsko-poslovna  
fakulteta

Okoljsko računovodstvo je del sistema ravnanja z okoljem in je novejši pristop, s katerim lahko podjetje poveča svojo okoljsko odgovornost. Snovanje sistema okoljskega računovodstva v podjetju in njegovo uvajanje je projekt, ki mora biti natančno opredeljen s planom potrebnih nalog.

Diplomsko delo v prvem delu prikazuje teoretično podlago za snovanje sistema okoljskega računovodstva s prikazom temeljnih nalog, ki morajo biti v podjetju opravljene, če podjetje želi takšen sistem vzpostaviti. Drugi del je praktično usmerjen in opisuje postopek snovanja sistema okoljskega računovodstva v podjetju X, d. d., ki deluje v panogi predelave odpadkov.

Dejanski primer prikazuje aktivnosti in spremembe, ki so v podjetju potrebne za kasnejše uvajanje omenjenega sistema okoljskega računovodstva. Avtorica želi opozoriti na posebnosti in potrebo po prilagajanju sistema, ki se pojavlja zaradi dejavnosti, v kateri deluje podjetje X, d. d.

Odgovorni za snovanje in uvajanje sistema morajo dobro poznati podjetje in njegove procese, proizvodni menedžment, računovodstvo in povezave med njimi. Ob tem je potrebno tudi teoretično znanje o razvidovanju okoljskih stroškov in s tem povezanih aktivnosti.

*Diploma paper*

## *ENVIRONMENTAL COST MANAGEMENT IN THE COMPANY X, plc.*

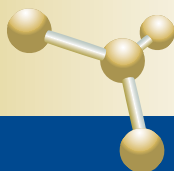
*Mentor: Dr. Bojana Korošec  
University of Maribor, Faculty of Economics and  
Business*

*An environmental management accounting system, as part of an environmental management system, is a relatively new approach for increasing responsibility for the organizational environment. Designing an environmental management accounting system has to be a precisely defined project, strengthened by an exact plan of the necessary tasks.*

*The first part of the diploma paper is about the theoretical base for creating and maintaining an environmental management accounting system into an organization. It defines all the activities needed for implementing an environmental management accounting system into an organization's operations. The second part of the Diploma paper presents a case study of creating an environmental management accounting system for the company X, plc.*

*The case study presents all the activities and changes which have to be made in the company for the implementation of an environmental management accounting system to be successful.*

*There is also a need to understand the theoretical bases of environmental cost accounting, so that defining environmental cost in a company can be made correctly.*



Diplomsko delo

## IDEJNI PROJEKT ZA POTNIŠKI TERMINAL-KOZMODROM NA LETALIŠČU EDVARDA RUSJANA V MARIBORU

Mentor: prof. mag. Peter Gabrijelčič  
Univerza v Ljubljani, Fakulteta za arhitekturo

Diplomsko delo obravnava razvoj aeronavtičnih tehnologij in neposredne vplive teh na gradnjo letališke infrastrukture. Opira se na tri glavna področja: vizijo, funkcionalnost in psihološke učinke na potnike.

Na eksperimentalen način oživlja dogajanje na letališču v Mariboru z obravnavanjem širšega prostora okrog letališča in z novim hibridnim terminalom, ki združuje mednarodni potniški promet in sodobno letalsko središče – kozmodrom.

Psihološki vidik potovanja z letali in letenje sta aplicirana v arhitekturno zasnovo. Novo nastala arhitektura se hoče približati potnikom in naravi, hkrati pa se podreja funkcionalni zasnovi ter mednarodni zakonodaji, ki velja za gradnjo letališč. Kljub mreži fluidne narave je pot potnikov izrazito ortogonalna in generična, forma pa s svojo dinamičnostjo povzame vizijo in psihologijo letenja ter zaobjame funkcijo v celovito in prepoznavno obliko.

Odličnost diplomskega dela se kaže pri zasnovi arhitekture, ki je posledica poglobljenega študija in angažiranosti. Arhitekturo sestavljata dva močna pola. Na eni strani izrazito racionalna, logična in funkcionalna zasnova potnikove poti in na drugi strani organska fluidna mreža, ki predstavlja stavbni plašč oziroma ovoj. Plašč sestavlja drevesasta jeklena konstrukcija, ki nima zgolj funkcije nosilnosti, temveč je ena od glavnih arhitekturnih motivov oziroma elementov.

Diploma paper

## DESIGN PROPOSAL FOR A PASSENGER TERMINAL- SPACEPORT AT THE EDVARD RUSJAN AIRPORT, MARIBOR

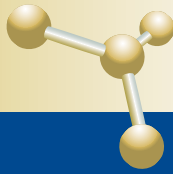
Mentor: Prof. Peter Gabrijelčič, MSc  
University of Ljubljana, Faculty of Architecture

The diploma paper processes the development of aeronautic technologies and the direct effects on the construction of air infrastructure. It uses the three main fields of vision, functionality and the psychological effects on passengers.

It re-animates the happenings at Maribor airport in an experimental way. It processes a wider space around the airport and a new hybrid terminal, which unites international passenger traffic and a modern air centre – a cosmodrome.

The psychological aspects of flying by plane are applied in the architectural design. The new architecture wants to come close to passengers and nature, but it also subordinates itself to the functional design and international laws that apply to the construction of airports. Despite the fluid net, the passenger's way is distinctively orthogonal and generic; the dynamically shaped form summarizes the vision and psychology of flying and takes the function into a whole and recognisable form.

The excellence of the diploma paper shows in the architectural design, which is the consequence of in-depth studies and engagement. The architecture is made of two strong poles. One side is distinctively rational, logical, and a functional design of a passenger's way. On the other side there is an organic fluid net which represents the envelope of the building. This layer consists of a tree-like steel construction, which is not just functional, but is one of the main architectural motives and elements.



Diplomsko delo

### RAZVIJANJE KONCEPTA UČEČE SE ORGANIZACIJE: PRIMERJALNA ANALIZA

Mentor: doc. dr. Branko Ilič  
Univerza v Ljubljani, Fakulteta za družbene vede

Osrednja teza diplomskega dela je, da se koncept učeče se organizacije, ki velja za sodoben, visoko razvit menedžerski koncept, lahko obravnava in ga je celo potrebno obravnavati z interdisciplinarnega vidika, če se ga želi uspešno implementirati v praksi.

Avtorica utemeljuje, da je za razvijanje tega koncepta, ki ga večina strokovne literature s tega področja definira predvsem kot načrtno uvajanje tipične organizacijske oblike ali specifičen pristop k upravljanju človeških virov, potrebna integracija različnih upravljaljskih pristopov. Med ključne dejavnike za razvijanje učeče se organizacije uvršča enotno marketinško orientacijo, ki v središče vseh poslovnih aktivnosti postavlja stranko in zadovoljevanje njenih potreb.

V diplomskem delu je hipoteza verificirana z analizo in integracijo različnih družboslovnih teorij, analitični del pa avtorica uravnoteži z empirijo. Iz študij primerov dveh podjetij razbira, da je interdisciplinarna obravnava koncepta učeče se organizacije možna in pomembna, saj je ta kompatibilen s konceptom marketinga, pri čemer je njuno najpomembnejše stičišče polje internega marketinga. Pri tem ugotavlja, da se preučevani organizaciji kljub aktivnim prizadevanjem za razvoj obeh idealno-tipskih konceptov od letih v določenih značilnostih odklanjata. Odkloni so posledica organskih odzivov, ki jih uspešna podjetja oblikujejo kot odgovor na kompleksno okolje.

Diploma paper

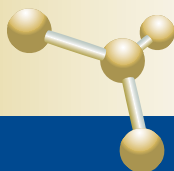
### DEVELOPING A LEARNING ORGANIZATION: COMPARATIVE ANALYSIS

Mentor: Assistant Prof. Dr. Branko Ilič  
University of Ljubljana, Faculty of Social Sciences

The main diploma paper is that the learning organization, considered as a contemporary, highly developed, managerial concept, could and should be examined by an inter-disciplinary approach in order to successfully implement it in practice.

The author substantiates that the integration of various managerial approaches is required for the development of the concept, in professional literature regarded mainly as deliberately establishing a typical organisational form, and in the context of human resource management. Unified marketing orientation, placing the customer and their satisfaction of needs, at the very centre of all business activities, is one of the key factors, enabling the establishment of the learning organisation model.

The Diploma paper verifies the thesis by analysis and integration of different social science theories, while the analytical part is balanced by empirical research. From the case studies of two companies, the author interprets that the inter-disciplinary approach to the concept of a learning organization is possible, and important, since the model is compatible with the concept of marketing with crucial junction in internal marketing. Nevertheless, the study revealed that both organizations, despite their active aspirations towards both ideally-typical concepts, differ from them in certain characteristics. Deviations could be understood as organic responses to a complex environment, emerging from organisational knowledge and experience, business orientation, branches, and other specifics constructing the organisational reality.



Diplomsko delo

## OSNOVNA ŠOLA LAVRICA

Mentor: prof. mag. Peter Gabrijelčič,  
univ. dipl. inž. arh.  
Somentorica: doc. dr. Alenka Fikfak,  
univ. dipl. inž. arh.  
Univerza v Ljubljani, Fakulteta za arhitekturo

Avtor v diplomskem delu odgovarja na vprašanje, kako izdelati najustreznejšo arhitekturno urbanistično rešitev za gradnjo Osnovne šole Lavrica s spremljajočimi dejavnostmi. Pri tem vprašanju se sklicuje na primerne prostorske pogoje za izvajanja pouka ter dodaja rešitev zunanjih površin in mirujočega prometa.

Znanstveni pristop je zaokrožen na tri področja: iskanje izhodišč v prostoru, določitev lokacije in merila same šolske stavbe. Kot osnova mu služijo obsežne analize zgodovine šolskih objektov, analize mikrolokacije in fotoanaliza.

V diplomskem delu se prepleta razumevanje problematike različnih področij, ki vključuje tako tehnično kot likovno estetsko vedenje, s poudarkom na sodobnih šolskih kompleksih v Sloveniji. Predstavlja zgleden primer snovanja izobraževalnega večetažnega objekta z vključitvijo športnega objekta osnovnega dimenzijskega razreda.

Avtor v delu aplikacije posega v sfero dejavnosti podjetja Trimo, poleg tega pa je rešitev uporabna ter zanimiva tudi širše. Presežek predstavljata kvaliteten izbor referenc in nadpovprečna tehnična risba.

Diploma paper

## PRIMARY SCHOOL, LAVRICA

Mentor: Prof. Peter Gabrijelčič, MSc (Architecture)  
Co-mentor: Assistant Prof. Dr. Alenka Fikfak,  
Bsc (Architecture)  
University of Ljubljana, Faculty of Architecture

The author uses this paper to answer the question on how to produce the most adequate architectural urban solution for the primary school, Lavrica, including extra-curricular activities. Suitable space requirements for class implementation is referred to, and adds a solution for external surfaces and the stationary traffic.

The scientific approach is consolidated into 3 areas: finding starting-points, determining a location, and measurement of the school building. Extensive analyses of the history of school facilities are used, analyses of the micro-location, and a photo-analysis as grounds for the paper.

The paper is structured as an intertwinement between understanding the issues from different areas, which also includes technical and artistic aesthetic knowledge, with the emphasis on modern school facilities in Slovenia. It presents an example of designing a several storied school facility, including a sports facility of basic dimensions.

The author's work corresponds with Trimo's area of expertise, and it is also a useful and interesting solution in a general sense. The quality selection of reference material and the above-average technical drawing make this paper exceptional.

Diplomsko delo

## IDEJNA ZASNOVA REVITALIZACIJE OBMOČJA TOPILNICE RUDNIKA ŽIVEGA SREBRA V IDRJI

Mentor: doc. dr. Tomaž Novljan  
Somentorica: doc. dr. Sonja Ifko  
Univerza v Ljubljani, Fakulteta za arhitekturo

V diplomskem delu je analizirano obstoječe stanje obravnavane lokacije s prostorskega vidika. Izpostavljeno je aktualno raziskovalno vprašanje.

Poleg dobrega občutka za ohranitev domače tehniške dediščine ter hkratnega sledenja najnovejšim dognanjem arhitekturne stroke izraža diplomsko delo še tehten posluš za ohranitev naravnega okolja, ki obdaja kompleks topilnice. Naravne danosti – konfiguracija terena in možnost naravne osvetlitve – so kreativno vtikane v strukturo diplomske naloge. Pri tem je izražen posluš avtorice za sozvočje obstoječih in novih kovinskih elementov in sklopov nosilnih konstrukcij.

Muzej današnjega in prihodnjega časa ni več le prostor prikazovanja nečesa, kar je bilo, temveč je postal prostor raziskovanja, socialnih interakcij, prostor večnamembnosti, ki je hkrati vpet v dogajanje lokalne družbene skupnosti.

Avtorica v diplomskem delu to nakazuje skozi predloge za restavracijo posameznih strojev in naprav, ki bi postali razumljivi širokemu krogu obiskovalcev – od laikov do strokovnjakov. Nekateri prostori in sklopi so dodatno nadgrajeni in obogateni z družabnimi in kulturnimi vsebinami, vezanimi na Idrijo in tudi širše.

Predlog za revitalizacijo območja topilnice kultivira ter prostorsko in kulturno ureja del prostora, ki je bil zaradi ukinitve proizvodnje živega srebra obsojen na propadanje.

Diploma paper

## REVITALISATION OF MERCURY MINE SMELTING PLANT AREA IN IDRJA

Mentor: Assistant Prof. Dr. Tomaž Novljan  
Co-Mentor: Assistant Prof. Dr. Sonja Ifko  
University of Ljubljana, Faculty of Architecture

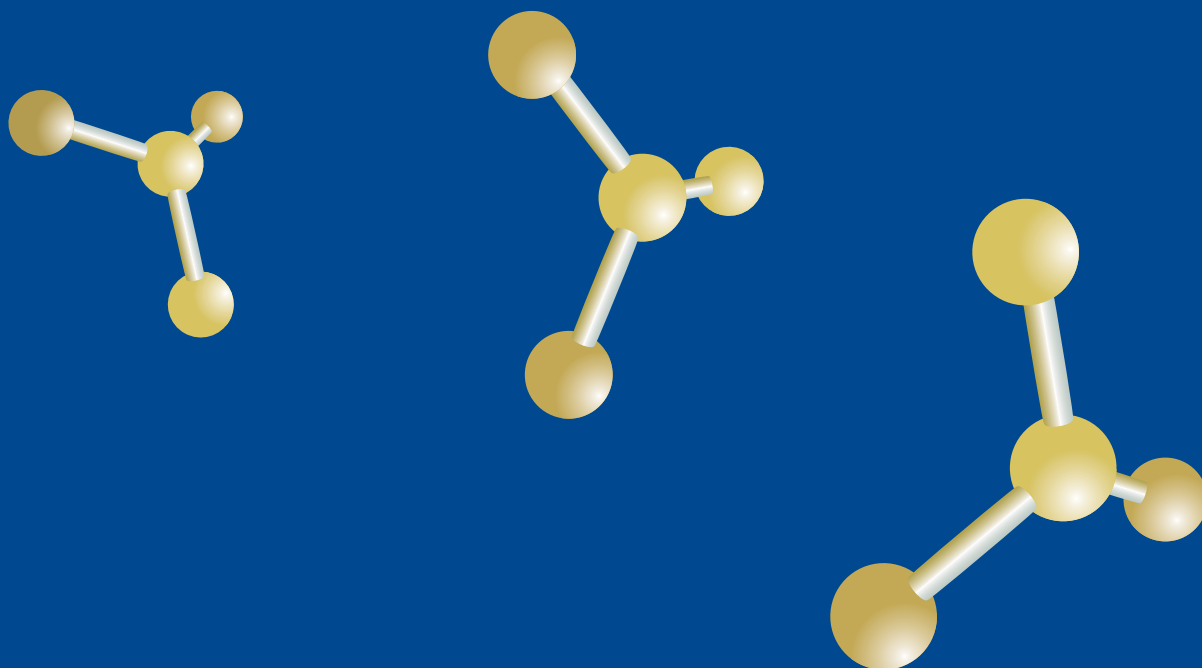
The diploma paper analyses the current condition of the site from a spatial point of view. The research question and issues are properly developed.

In addition to the preservation of the domestic engineering heritage and assessment of the latest trends in the architectural profession, the paper expresses strong sensitivity to preserving the natural environment surrounding the smelter complex. The surrounding terrain configuration and the possibility of natural lighting are creatively woven into the structure of the thesis. The author has combined existing and new metal components and load-bearing structures, in a harmonious way.

Museums of today and tomorrow are no longer just places displaying something that was. They have become spaces of exploration, social interaction, and multi-functionality, which also support their local social community.

The author indicates this through the proposals for restoration of individual machines and devices that make them accessible and understandable to a wide range of visitors - from laymen to experts. Some rooms and fixtures are further upgraded and enriched by social and cultural content related to the area of Idrija, and beyond.

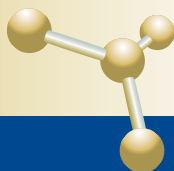
The proposal for the revitalization of the smelter area helps to organize the area in a spatial and cultural way. This is indeed important for an area which was, due to the cessation of mercury mining, sentenced to social decline.



ZBORNİK POVZETKOV NAGRAJENIH DEL  
ABSTRACTS OF THE PROJECTS AWARDED

**MAGISTRSKA DELA**

DISSERTATIONS



Magistrsko delo

## UPRAVLJANJE TVEGANJ V GRADBENIŠTVU

Mentor: prof. dr. Michael Theil  
Wirtschaftsuniversität Wien

Avtor je celovito opisal zelo kompleksno področje upravljanja tveganj na gradbenih projektih.

Enakovredno vključuje tako teorijo kot tudi analizo praktičnega primera. Na začetku opisuje razvoj upravljanja tveganj kot znanosti od samega začetka. Posebej podrobno predstavlja različne klasifikacije tveganj v gradbeništvu. Opiše proces učinkovitega ravnanja s tveganji ter strategije ravnanja s tveganji. Predstavlja študijo izvedljivosti projekta za določanje kritičnih parametrov. Obravnava več vprašanj okoli posameznikovega sprejemanja tveganih odločitev.

Predstavi finančno analizo uspešnosti projekta, finančne kazalnike, delitev prihodkov in stroškov na projektu. Podrobno opisuje proces ocenjevanja tveganj, ki ga delimo na analizo tveganj ter vrednotenje le-teh. Opisuje razlike med kvalitativno, polkvalitativno in kvantitativno metodo ocenjevanja tveganj.

V zadnjem delu avtor predstavi podjetje Komunaprojekt. Podatke analizira z različnimi metodami ter ugotavlja, da z uporabo simulacije stohastičnega modela dobimo bolj realne in zanesljive informacije o tveganjih kot z uporabo scenarijev.

Dissertation

## RISK MANAGEMENT IN THE CONSTRUCTION INDUSTRY

Mentor: Prof. Dr. Michael Theil  
Vienna University of Economics

*The author comprehensively describes the complex field of risk management in construction projects.*

*An equal representation of both theory and analysis of a practical example is included. Firstly, the development of risk management as a science from the very start is described. A special detailed presentation is made of different risk classifications in construction. Then the process of efficient risk management and risk management strategies are described. A study on project implementation for assessing critical parameters is presented. Several questions regarding the making of risky decisions are dealt with, and an individual's inclination towards taking risks.*

*A financial analysis of a successful project, with financial indicators, and distribution of income and revenue in the project is presented. A detailed description of the process of risk assessment divided into risk analysis and risk evaluation is also included. The differences between full-qualitative, semi-qualitative and quantifiable risk assessment methods are described.*

*In the last part the author presents the company Komunaprojekt. Data is analysed by different methods and the conclusion is reached that a simulation using the stochastic model achieves the more realistic and reliable information on risks than the use of scenarios.*

## Magistrsko delo

### TRŽNO KOMUNICIRANJE IN ETIČNO SPORNA DEJANJA PONUDNIKOV NA TRGU

**Mentorica:** prof. dr. Maja Makovec Brenčič  
Univerza v Ljubljani, Ekonomska fakulteta

Trenutne konkurenčne razmere na trgu zahtevajo od podjetij več kot samo dober izdelek, privlačno ceno in dostopnost izdelka. Pomemben element ob vsem tem je tržno komuniciranje, ki vedno bolj vpliva na ugled in s tem na uspeh podjetja nasploh. Tako ni nenavadno, da se podjetja trudijo ugajati čim širši javnosti tudi s tem, da vse bolj upoštevajo etični vidik. Kljub temu pa se v želji pritegniti pozornost potencialnega potrošnika kaj hitro lahko zgodi, da podjetje prestopi sprejemljivo mejo.

V teoretičnem delu magistrskega dela so predstavljena orodja tržnega komuniciranja, njihove prednosti, slabosti in tudi vloge, ki jih imajo posamezna orodja pri doseganju ciljev podjetja. Razložen je tudi pojem etike in pomen, ki ga ima skupaj z zakonodajo v poslovnem svetu. V nadaljevanju dela avtorica s praktičnimi primeri ponazori dosedanje izkušnje slovenskih podjetij na področju tržnega komuniciranja in etično sporna dejanja pri tem.

Avtorica delo nadgradi z empirično preverbo ter zaznavo tržnega komuniciranja in etično spornih dejanj v ciljni skupini slovenskih podiplomskih študentov s področja trženja in komuniciranja. Navedeno raziskavo poglobi še z globinskimi intervjuji prepoznavnih strokovnjakov tržnega komuniciranja na slovenskem trgu.

Magistrsko delo predstavlja uporaben pripomoček vsem, ki se znajdejo v dilemah izbora in izvedbe tržnokomunikacijskih aktivnosti in etičnosti v skladu z regulativami in zakonodajo.

## Dissertation

### MARKETING COMMUNICATION AND ETHICALLY CONTENTIOUS ACTS OF PROVIDERS ON THE MARKET

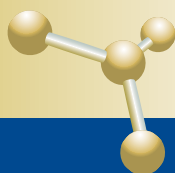
**Mentor:** Prof. Dr. Maja Makovec Brenčič  
University of Ljubljana, Faculty of Economics

The current market conditions require from enterprises more than just a good product, attractive price, and product availability. In addition, an important element is marketing communication, which increasingly affects the reputation and success of enterprises. So it is not unusual that enterprises are increasingly trying to please the audience by taking into account ethical considerations. Despite this, the desire to attract the attention of potential consumers can quickly lead to situations in which an enterprise can overstep the boundaries of what is acceptable.

In the theoretical part of the thesis the author presents the tools of marketing communication, their strengths and weaknesses, and the role played by individual tools in achieving the objectives of the enterprises. The author also presents the concept of ethics and the importance of legalization in the business world. Then, through practical examples, the author presents the experiences of Slovenian companies in the field of marketing communication and ethical issues.

The author upgrades the paper with empirical verification, a perception of market communication and ethically questionable actions in the target group of Slovenian post-graduate students of marketing and communication. The study is strengthened by in-depth interviews with acknowledged experts in market communication on the Slovenian market.

The dissertation presents a useful tool for everyone facing a dilemma when choosing or implementing activities in the field of marketing communication and ethics in accordance with regulations and legislation.



Magistrsko delo

## VLOGA PROJEKTNE PISARNE PRI URESNIČEVANJU STRATEŠKEGA PLANA S PRIMEROM PODJETJA TRIMO

Mentor: prof. dr. Rudi Rozman  
Univerza v Ljubljani, Ekonomska fakulteta

Avtorica se v magistrskem delu osredotoča na vlogo in pomen strateške projektne pisarne pri izboljševanju učinkovitosti in uspešnosti uresničevanja strategij podjetja s projekti in doseganja strateških ciljev.

Rezultat raziskovanja je oblikovanje modela uresničevanja strategij podjetja Trimo s projekti, ob ključni vlogi strateške projektne pisarne.

Model predvideva vzpostavitev strateške projektne pisarne na najvišjem nivoju organizacijske strukture ter formaliziranje večjega števila že obstoječih projektnih pisarn, odgovornih za izboljševanje vodenja posameznih vrst projektov, na drugem nivoju organizacijske strukture. V skladu z modelom je strateška projektna pisarna skupaj z vodstvom soodgovorna za oblikovanje strateškega projektne plana na podlagi sprejetih strateških ciljev in strategij podjetja ter za stalno usklajevanje ciljev posameznih projektov s strateškim projektним planom. Skupaj s projektним svetom strateška projektna pisarna skrbi za kontroliranje, razvoj in izboljševanje projektne in multiprojektne vodenja.

Strateška projektna pisarna tako prevzema odgovornost za razvoj in izboljševanje tistih faz procesa uresničevanja strategij s projekti, ki jih mnogi avtorji prepoznajo kot najbolj problematične in zaradi katerih je v mnogih podjetjih stopnja uspešnosti uresničevanja strategij s projekti na zelo nizki ravni.

Dissertation

## THE ROLE OF THE PROJECT OFFICE IN THE PROCESS OF IMPLEMENTING THE STRATEGIC PLAN, WITH THE COMPANY TRIMO AS A CASE STUDY

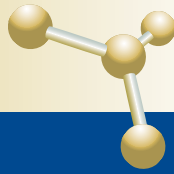
Mentor: Prof. Dr. Rudi Rozman  
University of Ljubljana, Faculty of economics

*This Master's dissertation is focused on the role and importance of the strategic project office, in the process of improving efficiency and effectiveness for implementing a company's strategies with projects and achieving strategic goals.*

*The result of the research is a model for implementing strategies in the Trimo company with projects, where the key role is having a strategic project office.*

*The model foresees the establishment of a strategic project office at the highest level of the company's organizational structure and formalization of a number of existing project offices, responsible for improving the management of individual types of projects at the second level of an organizational structure. In accordance with the model the strategic project office is co-responsible, together with the company's management, for designing a strategic project plan, on the basis of previously adopted strategic goals and company strategies, and for constant harmonization of individual project goals with a strategic project plan. Together with the project council, the strategic project office is additionally responsible for controlling, development, and improvement of project and multi-project management.*

*The strategic project office thus assumes responsibility for development and improvement of those phases within the process of implementing strategies with projects that a lot of authors recognize as the most problematic and which are the reason for the very low level effectiveness of implementing strategies with projects in a great number of companies.*



## Magistrsko delo

### CENTER ZA INOVACIJE V NOVEM SADU – ŠTUDIJA PARAMETRIČNEGA OBLIKOVANJA

Mentor: prof. dr. Predrag Šiđanin  
Somentor: asis. mag. Bojan Tepavčević  
Univerza v Novem Sadu, Fakulteta tehničnih znanosti, Oddelek za arhitekturo in urbanizem

Zaradi mnogih parametrov, ki so prisotni pri procesu oblikovanja in prilagajanja okolju, se pri povezovanju in upravljanju parametrov v realnosti uporablja algoritem za parametrično oblikovanje. Tako računalnik avtomatsko izdela 3D predstavitev zgradbe, pri čemer opredeli in spremeni vstopne vrednosti. Skupaj s programsko opremo za analizo okolja lahko ustvarimo niz drugih oblikovalskih možnosti, simuliramo učinek zgradbe in odziv na pogoje mestnega okolja ter nadzorujemo porabo in pridobivanje energije v realnem času. Ta zamisel dopušča določitev najboljše oblikovalske rešitve ob vseh pogojih.

Prosti ovoji zgradb, ki so bili ustvarjeni parametrično, so sestavljeni na podlagi rezultatov energijsko učinkovitih interaktivnih modularnih enot, ki imajo enako topologijo. To pomeni, da imajo enote enake značilnosti in se tako lahko njihova velikost prilagodi glede na lokacijo in obliko ovoja zgradb. Poleg tega lahko posamezni premiki v številkah pri teh modularnih enotah ustvarijo interaktivno fasado zgradbe ki bo predstavljala trenutni odziv na pogoje mestnega okolja ter na zahteve uporabnika.

Magistrsko delo poskuša najti odgovore na nekatera najpomembnejša vprašanja v arhitekturi kot na primer glede prihodnosti ovoja zgradbe, aktivne funkcije fasade in inteligentnega parametričnega oblikovalskega procesa.

## Dissertation

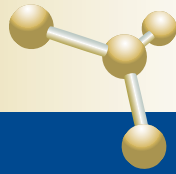
### CENTRE FOR INNOVATION IN NOVI SAD – PARAMETRIC DESIGN STUDY

Mentor: Prof. Dr. Predrag Šiđanin  
Co-mentor: Assistant Bojan Tepavčević, MSc  
University of Novi Sad, Faculty of Technical Sciences, Department for Architecture and Urban Planning

Because of many parameters that take part in the design process and adaptation to the environment, a parametric design algorithm is used to connect and manipulate all parameters in real time. Computing in such a manner automatically generates 3D representation of a building by defining and changing input values. In combination with environmental analysis software, it is possible to create a series of design alternatives, simulate building behavior and reactions to urban environment conditions, and control energy consumption and generation in real time. This concept allows defining the best design solution in all terms.

Free-form building envelopes created parametrically consist of numbers of energy efficient interactive modular units which have the same topology. This means that the units have the same features and, depending on the place and the shape of the building envelope, they can vary in size. Also, individual movements of numbers of these modular units can create an interactive building facade which represents the current response to urban environment conditions, as well as the user's requirements.

This Master's dissertation tries to answer some of today's most important architectural questions, such as the future of the building envelope, active façade functions and intelligence, and parametric design process.



## Magistrsko delo

### RAZVOJ SPLETNE APLIKACIJE ZA DINAMIČNO RAZPOREJANJE PROIZVODNJE V MALIH IN SREDNJE VELIKIH PODJETJIH

**Mentor:** red. prof. dr. Miroljub Kljajić  
Univerza v Mariboru, Fakulteta za organizacijske  
vede

Magistrsko delo obravnava razvoj spletne aplikacije za potrebe dinamičnega razporejanja proizvodnje v malih in srednjih podjetjih.

Glavni cilj je bil razvoj stroškovno ugodne, učinkovite rešitve za potrebe razporejanja proizvodnje v malih in srednjih podjetjih s poudarkom na dostopnosti, neodvisnosti od platform in enostavnosti uporabe. Zaradi tega se je avtor odločil za razvoj spletne rešitve, pri kateri je bil glavni poudarek na razvoju inteligentnega in dinamičnega uporabniškega vmesnika. Rešitev je zgrajena modularno in omogoča dinamično razporejanje naročil v proizvodnjo na podlagi metode umetne inteligence – genetskih algoritmov.

Rešitev je razvita kot samostojni informacijski sistem, ki preko administracijskega vmesnika omogoča upravljanje praktično vseh aktivnosti razporejanja. Tako lahko posameznim uporabniškim skupinam določamo ustrezne dostopne pravice in s tem uporabnikom omogočamo izvajanje posameznih aktivnosti. Poleg tega je v nalogi zajetih še pet glavnih funkcionalnosti, ki podpirajo dejavnosti razporejanja. Taka rešitev omogoča popisovanje sredstev, s katerimi podjetje razpolaga, uporabo le-teh v procesu planiranja proizvodnje, zbiranje podatkov o proizvodnih aktivnostih, ažurno razpečevanje informacij in izvajanje nadzora nad dogajanjem v sistemu.

## Dissertation

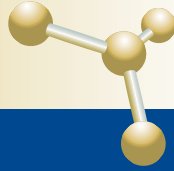
### RAZVOJ SPLETNE APLIKACIJE ZA DINAMIČNO RAZPOREJANJE PROIZVODNJE V MALIH IN SREDNJE VELIKIH PODJETJIH

**Mentor:** Prof. Dr. Miroljub Kljajić  
University of Maribor, Faculty of Organizational  
Sciences

*This dissertation describes the development of a web-based, dynamic job-shop scheduling system for small and medium enterprises.*

*The main objective was to develop a cost-effective, efficient solution for job-shop scheduling in small and medium enterprises with an emphasis on accessibility, platform independence, and ease of use. For these reasons, the author decided to develop a web-based solution with the main emphasis on the development of an intelligent and dynamic user interface. The solution is built upon modular programming principles and enables dynamic scheduling on the basis of artificial intelligence - the genetic algorithms.*

*The solution is developed as a stand-alone information system, which allows the management of virtually all scheduling activities through the administration panel. Appropriate access rights for an individual user group can be determined, thus enabling the users to use specific activities. In addition, the solution has covered five main functionalities that completely support the scheduling process. This means that the solution enables the inventory of resources made available in a company, using them in the process of production planning, collecting data on production activities, distribution of up-to-date information, and an insight into events in the system.*



## Magistrsko delo

### POMEN UJEMANJA ČUSTVENE INTELIGENTNOSTI VODJE IN ZAPOSLENEGA ZA ZADOVOLJSTVO ZAPOSLENIH

Mentor: doc. dr. Miha Škerlavaj  
Univerza v Ljubljani, Ekonomska fakulteta

V sodobnih podjetjih uspešnost ni odvisna le od uresničitve storilnostnih ciljev, torej produktivnosti, tržne prodornosti, dobička, zmanjševanja stroškov, ampak vsaj v enaki meri tudi od t. i. socialno-emocionalnih ciljev zaposlenih, kar se kaže v kakovosti socialnih odnosov in v klimi podjetja. Čustveno razviti ljudje se zavedajo samih sebe, razumejo svoje razpoloženje, poznajo svoja čustva in motivacijske vzrode ter učinke svojega delovanja na druge ljudi.

Omenjene osebnostne lastnosti, od »značaj« in »osebnosti« do »mehkih« ali duševnih spretnosti in »zrelosti«, bolj natančno dojemamo in tudi pojmujeemo pod skupnim imenom: čustvena inteligentnost.

Namen magistrskega dela je bil ugotoviti, ali je ujemanje v čustveni inteligentnosti vodje in zaposlenega povezano z zadovoljstvom zaposlenih.

Teoretični del je razdeljen na dve poglavji. Prvo poglavje govori o čustveni inteligentnosti, v drugem poglavju pa avtorica obravnava zadovoljstvo na delovnem mestu.

Drugi del je namenjen empirični analizi. Avtorica odgovori na raziskovalno vprašanje, kako ujemanje v čustveni inteligentnosti vodje in zaposlenega vpliva na zadovoljstvo zaposlenih. Na koncu poda glavne ugotovitve raziskave, izpostavi glavne omejitve in predstavi ideje za možne bodoče raziskave.

## Dissertation

### CHALLENGES FOR AN INEXPERIENCED, SELF-DIRECTING WORK TEAM ON THEIR WAY TO THE HIGH PERFORMANCE

Mentor: Assistant Prof. Dr. Miha Škerlavaj  
University of Ljubljana, Faculty of Economics

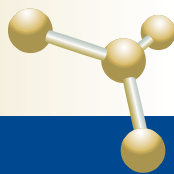
The performance of modern companies depends not only on the achievement of productivity goals, i.e. productivity, market penetration, profit and cost savings, but in equal measure also on the social and emotional goals of the employees. Emotionally fully developed people are self-aware and understand their mood, emotions, motivational triggers and the effects their actions have on other people.

The above mentioned personality traits, from "character" and "personality" to the "soft" or emotional skills and "maturity", are more precisely described and perceived under a common name: emotional intelligence.

The purpose of this Master's dissertation is to determine whether equal emotional intelligence of the leader and the employee is connected to employee satisfaction.

The theoretical part consists of two chapters. Chapter one covers the subject of emotional intelligence and chapter two covers the subject of job satisfaction.

Part two contains the empirical analysis, where the research question of how equal emotional intelligence of the leader and the employee influences employee satisfaction, is answered. At the end the main research results are outlined and describe the main limitations and suggested ideas for future research.



## Magistrsko delo

### PROCES »DIGITALNE VERIGE« V PROJEKTIRANJU IN REALIZACIJI ARHITEKTURE

Mentor: prof. Branislav Mitrovic  
Sommentor: prof. dr. Ludger Hovestadt  
Univerza v Beogradu, Fakulteta za arhitekturo,  
ETH Zurich

Pojem »digitalna veriga« predstavlja neprekinjen digitalni proces, sestavljen iz projektiranja (ideje, šifriranja, geometrijskih ugotovitev) in izdelave (uporabe CNC-izdelave (proizvodnje)). Vsak korak predstavlja programirano celoto, ki so med seboj povezane preko univerzalnega vmesnika. Računalnik ni več le pasivna digitalna risalna tabla, temveč predstavlja aktivno orodje, ki se uporablja pri projektiranju. Na temo »digitalne verige« ne obstaja veliko praktičnih primerov, tako se magistrsko delo ukvarja predvsem z raziskavami in razlagi.

Raziskava »digitalne verige« temelji na sestavi kataloga referenčnih virov, tako primerov iz teorije (publikacij in institucij) ter prakse (zgradbe) znotraj digitalnega procesa projektiranja in realizacije. Pristop »digitalne verige« je razložen s pomočjo določenih delov imenovanih »členi«, ki tvorijo ta proces. Povezave med njimi se imenujejo »povezovalniki«. Gre za splošna poimenovanja, ki pa imajo v kontekstu »digitalne verige« posebno razlago in odziv.

## Dissertation

### »DIGITAL CHAIN« PROCESS IN DESIGN AND PRODUCTION IN ARCHITECTURE

Mentor: Prof. Branislav Mitrovic  
Co-mentor: Prof. Dr. Ludger Hovestadt  
University of Belgrade, Faculty of Architecture, ETH  
Zurich

A "digital chain" is an uninterrupted digital process, consisting of design (idea, coding, geometric finding), construction (structure, junction, prototyping) and production (use of CNC-fabrication (manufacture)). Every step is a programmed entity and they are connected by universal interfaces. The computer is no longer a passive digital drawing board, but an active design-controlled work tool. As it would seem, there are not many examples with the specific topic of "digital chain". This thesis deals with its research and explanation.

The research of the "digital chain" is based on the constitution of the catalogue of the referenced sources, both theoretical (publications and institutions) and practical examples (buildings) inside a digital design process and realization. In the explanation of the "digital chain" approach, particular components called "links" form this process and the connections between them are called "connectors". These components have common names, but in relation to the "digital chain" have a special definition and behaviour.

Magistrsko delo

**PRIMERJALNA ANALIZA TRŽNIH  
POTENCIALOV DINAMIČNIH TRGOV  
DRŽAV BRIVC**

Mentor: izr. prof. dr. Milan Jurše  
Univerza v Mariboru, Ekonomsko-poslovna fakulteta

V sodobnem, dinamičnem času se kažejo osnove nove gospodarske ureditve sveta, v katerem vse večjo vlogo pridobivajo dežele v razvoju, predvsem Brazilija, Rusija, Indija in Kitajska (BRIC) ter druge hitro razvijajoče se dežele. Avtorica si je ob zaključku drugostopenjskega študija zato zadala cilj izvesti primerjalno analizo tržnih potencialov dinamičnih trgov držav BRIVC, kjer je standardnim BRIC državam dodala še Vietnam. Slednji postaja prava azijska zvezda, ki ponuja zanimive tržne priložnosti različnim panogam, ki pa jih slovenska podjetja zaenkrat še niso zaznala in posledično tudi ne izkoristila. Avtorico so zanimali zlasti vzvodi hitre rasti teh trgov in še posebej, kakšne tržne možnosti ponujajo države BRIVC slovenskim podjetjem.

Iz primerjalne raziskave jasno izhaja spoznanje o razsežnostih tržnih potencialov dinamičnih trgov držav BRIVC, ki slovenskim podjetjem lahko služi kot dobra osnova za selekcijo trgov ter za oblikovanje lastne strategije izhodne internacionalizacije na izbrane trge. Hkrati pa potrjuje teoretična spoznanja o tem, da morajo podjetja pred vstopom na te trge podrobneje spoznati pogoje poslovanja v posameznih državah, odkriti pasti in ovire pri vstopu na lokalne trge ter se seznaniti s poslovnimi navadami ter delovanjem birokracije in administracije v izbranih državah.

Naloga predstavlja uporaben vir za slovenska podjetja, ki iščejo dodatne informacije o perspektivnih državah. Delo je aktualno tudi z vidika podjetja Trimo kot globalno delujočega podjetja.

Dissertation

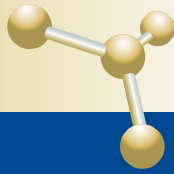
**COMPARATIVE ANALYSIS OF MARKET  
POTENTIAL IN DYNAMIC BRIVC  
COUNTRIES**

Mentor: Associate Prof. Dr. Milan Jurše  
University of Maribor, Faculty of Economics and  
Business

*In a modern, dynamic time a new base of the world economic order is born, where an increasing role acquires developing countries, especially Brazil, Russia, India and China (BRIC) and other rapidly developing countries as well. For this Master's dissertation, the author has prepared a comparative analysis of the market potential in dynamic BRIVC countries, to which Vietnam is added. Vietnam is becoming a new Asian Star, which offers interesting market opportunities across different sectors, which Slovenian companies have not detected and hence it follows that they have not used them before.*

*Based on the comparative analysis, the market potential of the dynamic BRIVC countries is evident, which can serve Slovenian companies as a good basis for selection of the markets and how to formulate a strategy of export oriented internationalization on the selected market. Furthermore, the research emphasizes that it is important to know the operating conditions in each country, to detect traps and barriers, which represent markets, and to meet business practice, functioning bureaucracy and administration of selected countries.*

*The Master's dissertation in question represents a useful source of information for Slovenian companies who are seeking additional information on prospective new markets. The dissertation is also useful for Trimo, which is a company that constantly seeks new opportunities on global markets.*



## Magistrsko delo

### RAZVOJ POSTOPKOV ZA EKONOMSKO UPRAVIČENO UPORABO ODPADNE MINERALNE VOLNE IZ PROCESOV TRIMO

Mentor: prof. dr. Danilo Suvorov  
Mednarodna podiplomska šola Jožefa Stefana

Magistrsko delo je usmerjeno v smotrno ravnanje z odpadnimi materiali, pri katerih naj zlasti odlaganje na deponije nadomesti ponovna uporaba. Kot primer je izbrana odpadna mineralna volna, ki v proizvodnji podjetja Trimo presega dva tisoč ton letno.

Z novimi zakoni bo odlaganje na deponijah zelo omejeno ali celo prepovedano, zato je bil cilj magistrskega dela preučiti možnosti za ekonomsko upravičeno uporabo odpadne mineralne volne. Poleg širšega vidika odgovornega ravnanja z materiali kot ključne zahteve trajnostnega razvoja je bilo treba upoštevati zlasti ekonomske cilje, kot so izogibanje stroškom zaradi kopičenja odpadkov, prevažanja in odlaganja na deponije, ekološke takse itn.

Delovna hipoteza tega magistrskega dela temelji na iskanju postopkov za uporabo odpadne mineralne volne brez večjih količin veziv za izdelavo panelov za akustično in toplotno izolacijo.

Sinteza eksperimentalnih rezultatov je vodila do originalne rešitve in razvoja panela iz odpadne mineralne volne, ki po lastnostih dosega standardne Trimoterm panele iz vpeljane proizvodnje, na nekaterih področjih pa jih presega (npr. boljše akustične lastnosti panela v nizkih frekvenčnih območjih).

Delo se zaključuje s stroškovno analizo, ki kaže, da bi novi proizvod dosegel konkurenčno ceno vpeljanemu Trimoterm panelu že pri bistveno nižjem proizvodnem obsegu.

## Dissertation

### DEVELOPMENT OF METHODS FOR ECONOMICALLY JUSTIFIABLE USE OF MINERAL WOOL WASTE FROM TRIMO'S PROCESSES

Mentor: Prof. Dr. Danilo Suvorov  
Jožef Stefan International Postgraduate School

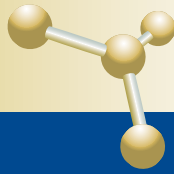
*This dissertation has been focused on the sound management of waste materials where recycling should significantly replace land filling. As an example, the waste mineral wool from the Trimo factory has been selected. Its quantity exceeds two thousand tons annually.*

*In future, deposition in landfills will be severely limited or even prohibited in compliance with the new laws. Therefore, the objective of the dissertation has been to study the possibilities for the economically viable use of waste mineral wool. In addition to the wider aspect of responsible management of materials as the key requirement of sustainable development, the economic criteria had to be particularly taken into account, e.g.: avoidance of costs due to waste accumulation, transport and deposition in landfills, ecological tax, etc.*

*The working hypothesis of this dissertation has been based on the search for procedures for the use of waste mineral wool without large quantities of binding agents for the production of panels for acoustic and thermal insulation.*

*A synthesis of experimental results has produced an original solution and supported the development of a panel made of waste mineral wool whose properties achieve those of standard Trimoterm panels manufactured in the established production and, in some fields, even exceed the standard ones (e.g. better acoustic properties of a panel in low-frequency ranges).*

*The work concludes with a cost analysis showing that the new product can achieve a price competitive to that of the existing Trimoterm panel at an essentially lower production volume.*



Magistrsko delo

## ORGANIZACIJSKA KULTURA UČEČE SE ORGANIZACIJE: PRIMER VISOKOTEHNOLOŠKEGA PODJETJA

Mentor: doc. dr. Miha Škerlavaj  
Univerza v Ljubljani, Ekonomska fakulteta

Magistrsko delo se osredotoča na analizo institucionalnega ustroja moderne, učeče se organizacije na primeru visokotehnoškega podjetja s področja informacijskih tehnologij. Gre za aktualno tematiko, ki obravnava odnose med zaposlenimi ter vpliv organizacijske kulture na uspešnost poslovanja podjetja.

Razvoj globalnih medmrežnih podjetij, kotjenaprimer Google Inc., je definiral moderno organizacijsko kulturo, ki postavlja v ospredje skrb za stranke in zaposlene. V tovrstnih visokotehnoških podjetjih se menedžerji zavedajo dejstva, da zaposleni niso zgolj strošek, temveč tudi vir bogastva podjetja, saj poslujejo v panogi, kjer predstavlja znanje edini vir trajne konkurenčne prednosti.

Odprtost, inovativnost, zaupanje in sodelovanje, osredotočenost na stalne izboljšave in dajanje moči za odločanje zaposlenim so značilnosti sodobnih podjetij, ki temeljijo na intelektualnem kapitalu ter pozitivnih moralnih vrednotah. Takšnim podjetjem pravimo učeče se organizacije.

Svoboda, pravičnost in enakopravnost so temeljne vrednote, ki bi jih menedžerji v podjetjih morali z avtentičnim vodenjem prenašati na vse zaposlene. V takšnih pogojih bodo zaposleni pripravljene sprejemati odgovornost za svoje delo, poleg tega pa bodo sposobni uresničevati svoje osebne vizije na način, ki bo koristil celotnemu podjetju. Ustvarjalno in demokratično delovno okolje spodbuja procese učenja ter inovativnost zaposlenih, ki je ena izmed bistvenih komponent uspešnosti visokotehnoških podjetij v sodobni družbi.

Dissertation

## ORGANISATIONAL CULTURE OF A LEARNING ENTERPRISE: CASE STUDY OF A HIGH-TECH COMPANY

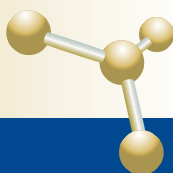
Mentor: Assistant Prof. Dr. Miha Škerlavaj  
University of Ljubljana, Faculty of Economics

*This dissertation focuses on the analysis of the institutional system of the modern learning organisation on the example of a high-tech IT company. This is a current topic that deals with relationships between employees and the effects of organisational culture on the success of the company's operations.*

*Recent development of global Internet enterprises, such as Google Inc., has defined an organisational culture, whose primary concern is the employees and the customers. In the companies with this organisational culture, managers are aware of the fact that employees do not only represent a cost, but also a source of the company's wealth, since they work in an industry where knowledge is their only sustainable competitive advantage.*

*Openness, innovation, mutual trust, and cooperation, as well as focus on constant improvement and employee empowerment to make decisions, are features of modern enterprises that are based on intellectual capital and positive moral values. Such enterprises are called learning organisations.*

*Liberty, justice, and equality, are fundamental values that managers should transfer to all employees via authentic management. Under these conditions, employees will be ready to take responsibility for their work; moreover, they will be capable of realising their own personal vision so as to benefit the whole company. A creative and democratic working environment stimulates learning processes and employee innovation, which is one of the key components of a highly successful, high-tech company, in modern society.*



Magistrsko delo

## UPORABA FOTOGRAMetriJE V RAZISKAVI IN REVITALIZACIJA TRDNJAVE BAČ

Mentorica: prof. dr. Nađa Kurtović - Folić, dipl. inž. arh.  
Somentorica: mag. Dubravka Đukanović  
Univerza v Novem Sadu, Tehnična fakulteta

Magistrsko delo je dokaz multidisciplinarnega pristopa k raziskavi in uspešen poizkus reševanja stvarnega problema.

V uvodu je izkazano izvrstno poznavanje historične kulture, uveljavljenih procesov valorizacije historičnih objektov, gradov in njihova konzervacija. Avtorica teze uspešno podkrepi s pozitivnimi praksami. Ob tem se pri zajemanju potrebnih natančnih projektnih podatkov ozira tudi na najnovejše znanstvene fotogrametrične metode.

Z intervencijo paviljona avtorica na novo označi mesto najstarejših delov gradu in s premišljenim izborom novih transparentnih fasadnih gradiv in sodobne led tehnologije obiskovalcu prikazuje manjkajoče historične tvorbe. Način detajliranja in raziskovanja ostalih preteklih obdobij ter njihovo vrednotenje v risbi predstavljata matrico za sorodne projekte.

Vrh strokovnega pomena naloga dosega z uporabo programske rekonstrukcije obstoječega stanja s pomočjo fotogrametrijskega snemanja. Na ta način so pridobljeni podatki o trenutnem stanju, materialih in konstrukciji z detajli. Po pridobitvi podatkov tako sledi generiranje digitalnega modela, ki kasneje služi kot osnova tehnični dokumentaciji, simulaciji, planiranju ali kulturnemu varstvu. Izgradnja fotogrametričnega modela pomeni osnovo pri reševanju odnosa staro-novo.

Presežek dela predstavlja kvalitetna tridimenzionalna predstavitev končne rešitve revitalizacije.

Dissertation

## RESEARCH BY PHOTOGRAMMETRIC METHOD AND REVITALIZATION OF THE FORTRESS OF BAČ

Mentor: Prof. Dr. Nađa Kurtović - Folić, architect  
Co-mentor: Dubravka Đukanović, MSc  
University of Novi Sad, Faculty of technical sciences

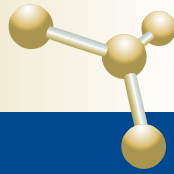
This dissertation is proof of multidisciplinary approach towards research and a successful solution of a contemporary problem.

The introduction displays excellent knowledge of historic culture, established processes for valorisation of historic buildings, castles, and their preservation. The theses are successfully substantiated by positive practices. Here, the latest scientific photometric methods are also considered in grasping the necessary accurate project data.

With the pavilion intervention the author newly marks the oldest parts of the castle. Carefully chosen new transparent facade parts and modern LED technology illuminate the missing historic formations to the visitor. The details and research of remains from past eras, their assessment in drawing also presents a matrix for similar projects.

The most important part of the paper from the professional point of view is the use of program reconstruction for the existing state of the castle with the help of photogrammetric filming. This way, she collected data on the current state of the building, materials, and detailed construction. This is followed by generating a digital model that can later serve as the basis for technical documentation, simulation, planning, and cultural protection. Building a photogrammetric model presents the basis in saving the relationship between old and new.

The quality 3D presentation of the final reconstruction solution elevates this paper on a higher level.



## Magistrsko delo

### **BLOK 69: MARGINE IN TERMINALI – POTNIŠKI TERMINAL**

**Mentorica:** prof. dr. Dragana Vasiljević Tomić,  
univ. dipl. inž. arh.

**Somentorja:** prof. dr. Milan Glišić, univ. dipl. inž.  
arh., doc. dr. Aleksandra Stupar, univ. dipl. inž. arh.  
Univerza v Beogradu, Fakulteta za arhitekturo

Projekt predstavlja urbanistično-arhitekturno idejno rešitev potniškega terminala na lokaciji Blok 69 v Novem Beogradu.

Z inovativno raziskovalno metodo avtor izpostavlja povezavo dveh značilnosti prostora (industrijski in turistični predel) ter idejo realizira s strukturo potniškega terminala, ki hkrati služi tako turističnemu namenu kot tudi lokalnemu prebivalstvu, kar se izraža v funkcionalni, programski in oblikovni projektni rešitvi.

## Dissertation

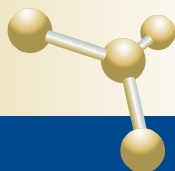
### **MARGINS AND TERMINAL: BLOCK 69**

**Mentor:** Prof. Dr. Dragana Vasiljević Tomić, BSc  
(Architecture)

**Co-mentors:** Prof. Dr. Milan Glišić, BSc (Architecture),  
Assistant Prof. Dr. Aleksandra Stupar, BSc (Architecture)  
University of Beograd, Faculty of Architecture

*The project is concerned with sublimated ideas that outline phenomena such as terminal and margins. The location of Block 69 in New Belgrade has been researched through an image formed by the Google Earth application.*

*Stressing the importance of virtuality as a mirror for perception, together with two important location features (shipyard / industry, Danube / tourism, leisure) creates a base for a post-modern view of the location. The passenger terminal was seen as a possible solution for the location. The terminal serves not only for tourists who are coming to Serbia / Belgrade, but for the local population also. Structures designated for these two groups are separated, but they are achieving leisure overlapping with industrial productivity and virtual presentation.*



Magistrsko delo

**OBDAVČITEV IZPLAČIL DRUŽBENIKOM  
KAPITALSKIH DRUŽB, OPRAVLJENIH  
NA KORPORACIJSKI PODLAGI**

Mentor: izr. prof. dr. Saša Prelič  
Somentor: dr. Marjan Odar  
Univerza v Mariboru, Pravna Fakulteta

Magistrsko delo obravnava obdavčitev izplačil družbenikom kapitalskih družb, opravljenih na korporacijski podlagi.

V prvem delu naloge so predstavljena izplačila družbenikom, kot so: udeležba v dobičku, izplačilo družbeniku ob prenehanju družbe, denarna odpravnina, izplačilo v primeru izključitve, izplačilo v primeru izstopa, denarno doplačilo, izplačilo ob zmanjšanju osnovnega kapitala družbe in izplačilo v primeru pridobivanja lastnih delnic oziroma pridobivanja lastnih poslovnih deležev.

V drugem delu naloge je najprej na kratko predstavljena trenutno veljavna zakonodaja na področju obdavčitve pravnih in fizičnih oseb, nato pa je za vsako od izplačil podrobno predstavljen način obdavčitve upravičenca tako v primeru pravne kot v primeru fizične osebe.

Dissertation

**TAXATION OF PAYMENTS TO  
SHAREHOLDERS IN CAPITAL  
COMPANIES MADE ON CORPORATE  
GROUND**

Mentor: Dr. Saša Prelič  
Co-mentor: Dr. Marjan Odar  
University of Maribor, Faculty of Law

*This Master's dissertation deals with the taxation of payments to shareholders of corporations, made on a corporate basis.*

*The first part deals with payments to shareholders as: profit contribution, contribution to the liquidation estate, appraisal remedy, squeeze out payments, sell out payments, cash adjustments, redemption of share capital, and payment for acquisition of own shares.*

*The second part of the dissertation starts with a short presentation of the current legislation covering taxation of payments on legal and natural persons. Later, taxation for each type of payment is explained in detail, for both legal and natural persons.*

Magistrsko delo

**VZPOSTAVITEV URAVNOTEŽENEGA  
MERJENJA USPEŠNOSTI IN  
NAGRAJEVANJA NA RAVNI PODJETJA  
IN NA RAVNI POSAMEZNIH  
GRADBENIH PROJEKTOV**

**Mentorica: doc. dr. Sergeja Slapničar  
Univerza v Ljubljani, Ekonomska fakulteta**

Magistrsko delo predstavlja vzpostavitev sistema merjenja uspešnosti gradbenega podjetja kot celote in posameznih gradbenih projektov s pomočjo sistema uravnoteženih kazalnikov, ki merijo tako finančno kot nefinančno uspešnost podjetja oziroma projekta. Na tej podlagi je predstavljen predlog sistema nagrajevanja zaposlenih, ki usmerja zaposlene k čim večji učinkovitosti dela in posledično k večji uspešnosti podjetja.

Vzpostavitev sistema merjenja uspešnosti in nagrajevanja je aplikativno prikazana na gradbenem podjetju SGP Tehnik, d. d., iz Škofje Loke. Tako bo podjetje lahko izoblikovalo nefinančno merjenje uspešnosti poslovanja, poleg tega pa sistem nagrajevanja na podlagi doseganja rezultatov. Za doseganje boljše spremljave in uspešnejšega prihodnjega poslovanja podjetja ter za večje zadovoljstvo vseh deležnikov (lastnikov, zaposlenih, kupcev in ostalih) je nujno, da se vzpostavi sistem merjenja uspešnosti poslovanja in model nagrajevanja na podlagi doseganja poslovnih rezultatov.

Namen magistrskega dela je pomagati podjetjem, predvsem v gradbeništvu, pri merjenju uspešnosti poslovanja podjetja in pri motiviranju zaposlenih, da bodo težili k doseganju čim boljših rezultatov projekta in posledično celotnega podjetja.

Dissertation

**THE IMPLEMENTATION OF A BALANCE  
SCORECARD IN A COMPANY AND AT  
THE CONSTRUCTION PROJECT LEVEL**

**Mentor: Assistant Prof. Dr. Sergeja Slapničar  
University of Ljubljana, Faculty of Economics**

*This dissertation presents the implementation of a performance measurement system in the whole company and in individual construction projects, by means of Balance Scorecard (BSC), which measures not only the financial progress, but also non-financial performance of the company and the project respectively. Based on this, an appropriate rewarding system is suggested, which directs employees towards greater work effectiveness and consequently towards better company performance.*

*The implementation of the performance measurement system and reward system are demonstrated in the construction company, SGP Tehnik, d. d., from Škofja Loka. With this, the company will be able to follow the business performance from the non-financial aspect and simultaneously financially motivate employees based on the performance measurements obtained. To achieve greater successful future performance, and also more stakeholder satisfaction, it is crucial that the performance measurement system and rewarding system, based on achieving business goals, are implemented.*

*The purpose of this dissertation is to help companies, particularly in the construction sector, to measure business performance at a company level and also at a project level; and at the same time help them to motivate employees.*

Magistrsko delo

**KRITIČNA ANALIZA DEJAVNIKOV  
USPEŠNEGA URESNIČEVANJA  
POGAJALSKIH CILJEV: IZSLEDKI  
EMPIRIČNIH RAZISKAV NA PRIMERU  
SLOVENSКИH PODJETNIKOV**

Mentorica: doc. dr. Darja Peljhan  
Univerza v Ljubljani, Ekonomska fakulteta

V magistrskem delu avtorica obravnava sodoben koncept poslovnih pogajanj, ki ga v veliki meri določa sposobnost in naravnost pogajalcev dosežati vzajemno koristne rešitve, ki na eni strani pomenijo zadovoljstvo udeleženih strani z doseženim dogovorom v procesu pogajanj, hkrati pa predstavljajo izhodišče za razvoj uspešnih dolgoročnih partnerstev.

Da bi pogajalci zasledovali vzajemno koristne izide pogajanj, morajo najprej poznati in nato v praksi upoštevati dejavnike uspešnega uresničevanja pogajalskih ciljev, ki vključujejo: temeljito pripravo na pogajanja, izbiro ustrezne strategije, učinkovito komuniciranje, razširitev informacijske baze z relevantnimi informacijami, sodelovalen odnos do druge strani, sposobnost razmišljanja v okviru strateških usmeritev podjetja, uspešno obvladovanje situacij (aktivno poslušanje), zastavljanje pravih (preiskovalnih) vprašanj, objektivno obravnavanje in sprotno razreševanje problemov (konfliktov).

V okviru izvedenih raziskav med slovenskimi podjetniki in podjetnicami v letih 2005 in 2008 je avtorica ugotavljala, kako dobro le-ti poznajo in v praksi upoštevajo določene združevalne elemente poslovnih pogajanj.

Njen sklep je, da se slovenski podjetniki in podjetnice ne zavedajo dovolj potencialnih prednosti upoštevanja nekaterih dejavnikov uspešnega uresničevanja pogajalskih ciljev, s čimer si v precejšnji meri poslabšujejo pogajalski položaj.

Dissertation

**A CRITICAL ANALYSIS OF FACTORS  
FOR THE SUCCESSFUL ACHIEVEMENT  
OF NEGOTIATING GOALS: FINDINGS  
OF EMPIRICAL RESEARCH IN THE CASE  
OF SLOVENIAN ENTREPRENEURS**

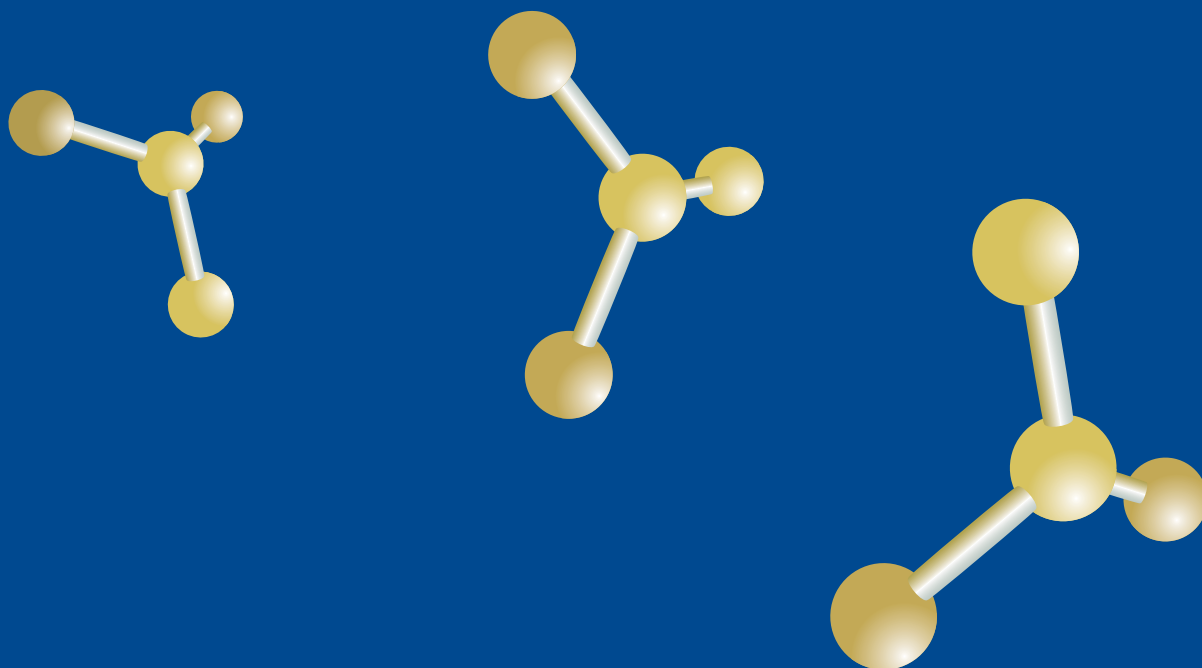
Mentor: Assistant Prof. Dr. Darja Peljhan  
University of Ljubljana, Faculty of Economics

*In the framework of this dissertation, the author processes the contemporary concept of business negotiations which is, to a large degree, determined by the ability and disposition of negotiators to reach beneficial solutions reciprocally.*

*In order for negotiators to pursue reciprocally useful outcomes of negotiations, they must first recognize certain factors for the successful achievement of negotiating goals; in addition, they must consider them in practice. These factors include: thorough preparation, choice of an appropriate strategy, efficient communication, up-to-date expansion of the information base with relevant data, a cooperative attitude towards the other side, the ability to think in the framework of strategic orientation of the company, successfully overcoming different situations - active listening, raising the correct (investigative) questions, objective handling, and up-to-date problem (conflict) resolution.*

*In the context of the research, which the author carried out among Slovenian entrepreneurs in 2005 and 2008, I was able to determine whether they identify, and use in practice, the addressed unifying elements of negotiations.*

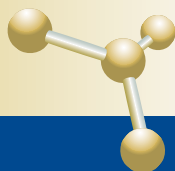
*It can be concluded that Slovenian entrepreneurs are not sufficiently aware of the potential advantages of certain factors for successful achievement of negotiating goals, such as the importance of thorough preparation for negotiations, and this is consequently undermining their negotiating position.*



ZBORNİK POVZETKOV NAGRAJENIH DEL  
ABSTRACTS OF THE PROJECTS AWARDED

**DOKTORSKE DISERTACIJE**

DOCTORAL THESES



Doktorska disertacija

## PREDLOG MODELA ZA NAČRTOVANJE INFORMACIJSKIH SISTEMOV ZA PODPORO USTVARJANJU IN UPORABI ZNANJA

Mentor: prof. dr. Kevin C. Desouza  
Univerza v Ljubljani, Ekonomska fakulteta

Kako izboljšati uporabo obstoječega in ustvarjanje novega znanja je danes eno bistvenih vprašanj, s katerimi se ukvarjajo organizacije. Kljub obilici produktov v praksi in številnim diskusijam v teoriji je področje načrtovanja in razvoja KMS (Knowledge Management Systems) nejasno in nedorečeno. Temeljna teza disertacije je, da mora biti KMS prilagojen znanjskim potrebam, ki jih imajo zaposleni v okviru vsakdanjega dela, in da se te potrebe razlikujejo znotraj organizacije.

Model načrtovanja KMS, ki je rezultat te disertacije, predlaga možen način analize znanjskih potreb zaposlenih in ugotavlja, kako narava teh potreb vpliva na izbiro takšnega KMS, ki bo ustrezno podprl z znanjskimi aktivnostmi prežete poslovne procese (oz. vsakdanje delo).

Predlagani model razvijalcem in načrtovalcem KMS, pa tudi menedžerjem, poleg načrtovanja prihodnjih KMS omogoča tudi oceno preteklih že vpeljanih KMS. Pomembno dopolnjuje obstoječa spoznanja na tem področju. Nasprotno od večine literature potrjuje potrebo po segmentiranem pristopu pri gradnji KMS, ki rezultira v portfelju KMS rešitev, ki zadovoljujejo različne profile zaposlenih. Disertacija vpeljuje tudi koncept skladnosti med znanjskimi potrebami in KMS tehnologijo, ki ni več »črna skrinjica«, temveč konstrukt pojasnjenih elementov. Dodatno podaja predlog napotkov za uporabo modela v praksi.

Doctoral thesis

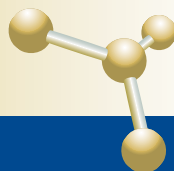
## TOWARDS KNOWLEDGE NEEDS- TECHNOLOGY FIT MODEL FOR KNOWLEDGE MANAGEMENT SYSTEMS

Mentor: Prof. Dr. Kevin C. Desouza  
University of Ljubljana, Faculty of Economics

*Improving knowledge leverage in organizations, to improve business performance, is considered as a major organizational challenge at present. To the best of the researcher's knowledge, current literature has not yet provided an answer on how to go about designing KMS (Knowledge Management Systems). The basic proposition of this research is that KMS has to fit the knowledge needs and that needs differ across different organizational contexts.*

*In order for KMS to provide value, a KMS-design process should account for these differences and suggest what kind of technology meets these needs. The tentative design model suggested by this research states how to analyze the knowledge needs of employees, and how the nature of such knowledge needs influences the design of a KMS to enable and support knowledge creation and utilization, in everyday work practice.*

*The design model presented in this dissertation will enable the KM community to critically evaluate the efforts underway to leverage organizational knowledge with KMS. The model suggested has made several advancements over the existing KMS work. Contrary to mainstream research, it confirms that developing one company-wide KM solution would not be fruitful. Next, it has introduced a "Knowledge needs / KMS fit" concept which is not a monolithic or 'black box' structure, but rather a well defined union of its rightful constituent parts. Additionally, practitioner guidelines on how to use the model to build a KMS, as part of a knowledge-related organizational change project, are proposed.*



MARKO BERGINC

Doktorska disertacija

**VPLIV SNOVNOGEOMETRIJSKIH  
LASTNOSTI IN POGOJEV  
DELOVANJA NA UČINKOVITOST  
ELEKTROKEMIJSKIH SONČNIH CELIC**

**Mentor:** prof. dr. Marko Topič, univ. dipl. inž. el.  
**Somentorica:** dr. Urša Opara Krašovec,  
univ. dipl. kem.  
Univerza v Ljubljani, Fakulteta za elektrotehniko

V doktorski disertaciji so predstavljeni delovanje, izdelava in karakterizacija elektrokemijskih sončnih celic, katerih zmogljivost je bila skrbno preučena pod najrazličnejšimi pogoji delovanja.

Celice z različnimi koncentracijami joda v elektrolitu so bile pomerjene pri njihovih različnih temperaturah in intenzitetah vpadne svetlobe. Nabor številnih meritev je privedel do oblikovanja rekombinacijsko-difuzijskega modela delovanja celice. Difuzija I<sup>3</sup>-iona v elektrolitu in rekombinacija generiranih elektronov v TiO<sub>2</sub>-plastki z ioni I<sup>3</sup>-elektrolita sta bili prepoznani kot dva najbolj omejujoča procesa. Oba sta odvisna tako od koncentracije dodanega joda v elektrolitu in temperature celice kot tudi od intenzitete vpadne svetlobe.

Elektrokemijske sončne celice so optično delno prepustne, zato znaten del svetlobe prehaja skozi celico. Preusmeritev prepuščene svetlobe nazaj na aktivno plast močno poveča učinkovitost pretvorbe. Tako je v disertaciji predstavljena tudi nova rešitev zadnje odbojne plasti, nameščene na zunanjo stran zadnje elektrode. Prednost le-te je predvsem v povečanju ujetja svetlobe v celici brez neposrednega omejevanja gibanja elektronov v TiO<sub>2</sub>-plastki oz. gibanja I<sup>3</sup>-ionov v elektrolitu.

Doctoral thesis

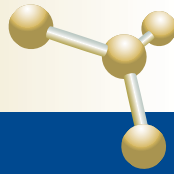
**THE INFLUENCE OF GEOMETRY,  
MATERIAL PROPERTIES AND  
OPERATIONAL CONDITIONS ON THE  
PERFORMANCE OF DYE-SENSITIZED  
SOLAR CELLS**

**Mentor:** Prof. Dr. Marko Topič, BSc (Electrical Eng.)  
**Co-mentor:** Dr. Urša Opara Krašovec, BSc (Chem.)  
University of Ljubljana, Faculty of Electrical Engineering

*This doctoral thesis presents the operation, production, and characteristics of dye-sensitized solar cells. Their capacity has been carefully studied under various operational conditions.*

*Cells with different concentrations of iodine in an electrolyte have been measured at different temperatures and varied intensity of incident light. The assortment of numerous measurements helped form the recombined diffusion model of a cell's operation. The diffusion of I<sup>3</sup> ion in the electrolyte and the recombination of generated electrons in the TiO<sub>2</sub> layer have been recognised as 2 of the most limiting processes. They both depend on the concentration of added iodine to the electrolyte, cell temperature, and the intensity of incident light.*

*Dye-sensitized solar cells are optically partially permeable, that is why a considerable part of light can pass through the cell. Redirecting the permeable light back to the active layer extensively increases the efficiency of transformation. A new solution of backside reflecting layer installed to the exterior part of the last electrode is presented in the dissertation. Its advantage lies in the increased light captured in the cell without direct limitation of electron movement in the TiO<sub>2</sub> layer, that is, of the movement of I<sup>3</sup> ions in the electrolyte.*



Doktorska disertacija

## RAČUNALNIŠKO MODELIRANJE CELIČNIH GRADIV NEUREJENE STRUKTURE

Mentor: red. prof. dr. Zoran Ren  
Univerza v Mariboru, Fakulteta za strojništvo

Doktorska disertacija obravnava nove metode napovedovanja obnašanja geometrijsko neurejenih celičnih gradiv pod vplivom udarnih dinamičnih mehanskih obremenitev s pomočjo računalniških simulacij. V ta namen so v disertaciji povezana aktualna raziskovalna področja uporabe, konstruiranja, modeliranja in računalniških simulacij geometrijsko neurejenih celičnih gradiv.

Izvedene raziskave dajejo nov vpogled v procese deformiranja neurejenih celičnih gradiv in posledično omogočajo razvoj izboljšanih celičnih gradiv, ki so neposredno uporabna za gradnjo inovativnih izdelkov v raznih industrijskih panogah.

Za namen validacije uporabe razvitih modelov v računalniških simulacijah so bili opravljeni eksperimentalni preizkusi vzorcev aluminijastih odprtoceličnih gradiv. Rezultati preizkusov so pokazali zelo dobro ujemanje z rezultati računalniških simulacij. To dokazuje primernost uporabe Weaire-Phelanovih modelov neurejenih celičnih gradiv v računalniških simulacijah obnašanja teh gradiv pri različnih robnih pogojih in obremenitvah.

Primerjava rezultatov izvedenih eksperimentalnih preizkusov vzorcev ter parametričnih računalniških simulacij njihovega obnašanja pod preskusnimi pogoji dokazuje, da je razvite računalniške modele možno, z visoko stopnjo zanesljivosti, uporabiti za določanje konstrukcijskih parametrov celičnih gradiv glede na specifične zahteve posamezne uporabe.

Doctoral thesis

## COMPUTATIONAL MODELING OF IRREGULAR CELLULAR STRUCTURES

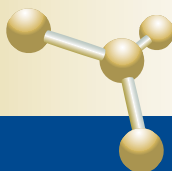
Mentor: Prof. Dr. Zoran Ren  
University of Maribor, Faculty of Mechanical  
Engineering

*This doctoral thesis describes new methods for behaviour prediction of geometrically irregular cellular structures under the influence of impacting mechanical loads, by means of computer simulations. To this end, the dissertation combines current research in the field of design, usage, modelling, and computer simulations, of geometrically irregular cellular structures.*

*Research conducted gives new insights into the deformation processes of irregular cellular structures and consequently enables the development of improved cellular structures, which are directly applicable for construction of innovative products in various industries.*

*Experimental testing programme of aluminium open-cell samples was carried out for the validation purposes of the developed computer simulation models. The experimental results show good agreement with the results of computer simulations, which confirms the suitability of the Weaire-Phelan models of cellular structures for use in computer simulations with various boundary conditions and loads.*

*Comparison of the experimental results and the results of parametric computer simulations of their behaviour under the same boundary conditions indicates that the developed computer models can be used reliably for determining the design parameters of cellular structures, according to the specific requirements of a given application.*



Doktorska disertacija

## MODELIRANJE IN OPTIMIZACIJA NAPREDNIH OPTIČNIH KONCEPTOV V TANKOPLASTNIH SONČNIH CELICAH

Mentor: izr. prof. dr. Janez Krč, univ. dipl. inž. el.  
Univerza v Ljubljani, Fakulteta za elektrotehniko

Doktorska disertacija obravnava napredne optične koncepte v tankoplastnih silicijevih in kalkopititnih (CIGS) sončnih celicah z namenom izboljšanja optičnih razmer v strukturah celic.

Razviti so bili teoretični modeli in orodja za analizo in optimizacijo obstoječih struktur tankoplastnih celic in razvoj novih, izboljšanih struktur. Najpomembnejši med njimi so: model za določevanje kompleksnih lomnih količnikov tankih plasti, optimizacijsko orodje Optimo za optični simulator SunShine in dvodimenzionalni optični simulator Femos. S pomočjo razvitih orodij so bili analizirani in optimizirani napredni optični koncepti, med njimi vloga dodatne hrapavosti sprednjega kontakta v tankih CIGS celicah in vloga novih tipov reflektorjev v tankih CIGS strukturah celic (ZnO/Ag, bela barva).

Pri analizi periodičnih struktur je prikazan potencial fotonских kristalov, s katerimi je možno doseči 100-odstotno odbojnost v želenem valovnem področju. Med periodične strukture spadajo tudi uklonske mrežice, pri katerih so analizirani različni optični efekti, ki jih vnašajo periodične strukture: protiodbojni efekt, razprševanje svetlobe in plazmonski efekt na hrapavih površinah kovin. Z upoštevanjem vseh treh efektov je bila določena optimalna geometrija uklonskih mrežic za tankoplastne sončne celice iz mikrokristalnega in amorfne silicija.

Doctoral thesis

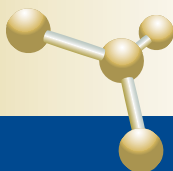
## MODELLING AND OPTIMIZING ADVANCED OPTICAL CONCEPTS IN THIN-FILM SOLAR CELLS

Mentor: Associate Prof. Dr. Janez Krč, BSc  
(Electrical Eng.)  
University of Ljubljana, Faculty of Electrical  
Engineering

*This doctoral thesis discusses advanced optical concepts in thin-film silicon and CIGS solar cells with the aim to improve optical conditions in cell structure.*

*Theoretical models and tools for analysis and optimisation of existing structures of thin-film cells and the development of new and improved structures have been developed. The most important ones include the model for assessing complex refractive indices in thin-films, optimizing tool Optimo for the optical simulator SunShine and the two-dimensional optical simulator Femos. These developed tools helped analyse and optimize advanced optical concepts, including the role of additional roughness of the front contact in thin CIGS cells, and the role of new types of reflectors in thin CIGS cell structures (ZnO/Ag, the colour white).*

*The potential of photonic crystals is presented in the analysis of periodic structures. A 100 % reflectance in any desired wave band can be achieved with these crystals. Periodic structures include diffraction gratings, where different optical effects entered by periodic structures are analysed. They include: anti-reflective effect, light diffusion, and the Plasmon effect on rough metal surfaces. With consideration of these 3 effects an optimal geometry of diffraction gratings for thin-film solar cells made from microcrystalline and amorphous silicon was established.*



Doktorska disertacija

## NELINEARNA ANALIZA VPLIVA POŽARA NA SOVPREŽNE LINIJSKE KONSTRUKCIJE

Mentor: izr. prof. dr. Stanislav Srpčič  
Somentor: izr. prof. dr. Igor Planinc  
Univerza v Ljubljani, Fakulteta za gradbeništvo  
in geodezijo

V disertaciji je predstavljen nov numerični model za geometrijsko in materialno nelinearno požarno analizo sovprežnih nosilcev iz jekla in betona z upoštevanjem zdrsa med slojema.

Numerični model je razdeljen v tri matematično nepovezane faze. V prvi fazi je s pomočjo požarnih krivulj določeno časovno spreminjanje temperatur požarnega prostora. Na osnovi ireverzibilne termodinamike je v drugi fazi določeno časovno spreminjanje temperatur jeklenega nosilca ter časovno spreminjanje temperatur v betonski plošči med požarom. Tretjo fazo predstavljenega numeričnega postopka za požarno analizo sovprežnih nosilcev predstavlja določitev napetostnega in deformacijskega stanja sovprežnega nosilca.

Bistvene novosti te faze požarne analize so:

- (i) upoštevanje zdrsa med jeklenim nosilcem in armiranobetonsko ploščo,
- (ii) modeliranje jeklenega nosilca in armiranobetonske plošče z Reissnerjevim geometrijsko točnim modelom ravninskega nosilca,
- (iii) upoštevanje materialno nelinearnega in od temperature odvisnega obnašanja jeklenega nosilca, armiranobetonske plošče in stika med slojema,
- (iv) upoštevanje temperaturnih deformacij in časovno ter temperaturno odvisnih deformacij, jekla, armature in betona.

Doctoral thesis

## NONLINEAR ANALYSIS OF COMPOSITE PLANAR STRUCTURES EXPOSED TO FIRE

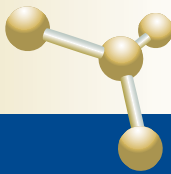
Mentor: Associate Prof. Dr. Stanislav Srpčič  
Co-mentor: Associate Prof. Dr. Igor Planinc  
University of Ljubljana, Faculty of Civil and  
Geodetic Engineering

The subject of this thesis is a new numerical model, for a geometrical and material non-linear fire analysis of composite linear beams, taking into account the interlayer slip.

The numerical model is divided into three mathematically separated phases. The first phase uses fire curves in order to determine the time-dependent change of temperatures of fire space. Based on irreversible thermo-dynamics the second phase determines the time-dependent change of temperatures of a steel beam and the time-dependent change of temperatures in a concrete slab during a fire. The third phase of the presented numerical procedure, represents the determination of the stress-strain state of a composite beam in fire.

The main innovations of this particular part of the fire analysis are as follows:

- (i) taking into account the slip between a steel beam and reinforced concrete deck,
- (ii) modeling of a steel beam and reinforced concrete deck using the Reissner geometrically exact model of a planar beam,
- (iii) taking into account the materially non-linear and temperature dependent behaviour of a steel beam and reinforced concrete deck, as well as contact between layers,
- (iv) taking into account the temperature deformations and time, as well the temperature dependent deformations of the steel, reinforced bars, and concrete.



Doktorska disertacija

## MODEL ZA IZBOLJŠANJE SISTEMA OKOLJSKEGA UPRAVLJANJA S POMOČJO PROGRAMSKE OPREME Z VEČ MODULI

Mentor: red. prof. dr. Zdravko Krivokapić  
Somentorja: red. prof. dr. Milan Perović, red.  
prof. dr. Stanka Filipović  
Univerza v Črni Gori, Fakulteta za strojništvo v  
Podgorici

V doktorski disertaciji je predstavljena obširna raziskava o izkoriščanju informacijskega sporočanja (ICT), predvsem glede kakovostnega modeliranja okoljskih vidikov.

Uporaba nevronske omrežije ustvarjenih na podlagi velike količine podatkov, ki so jih zbrale organizacije s certifikatom ISO 14001, je potrdila dosežek cilja in zanesljivo oceno okoljskih vplivov ne glede na področje delovanja organizacije. Široko zastavljeni pristop za izboljšanje strateškega sistema upravljanja imenovan 'Balanced Scorecard' smo uporabili tudi takrat, ko so bili doseženi osnovni pogoji standarda ISO 14001, da bi ustvarili sistem, ki bi zagotovil stalno izboljšavo ekološkega delovanja.

Avtorica je na podlagi praktične ocene modelov izpostavila, da tisti modeli, ki vsebujejo dva BSC modela, od katerih je en usmerjen v zaščito okolja, zagotavljajo veliko boljše rezultate. Avtorica je med pisanjem disertacije združila rezultate in tako ustvarila model za izboljšanje sistema okoljskega upravljanja.

Uporaba programskih sistemov v vseh procesih znatno izboljša delovanje in ustvarja pogoje za hitro odzivanje in spremembe znotraj in izven organizacij.

Doctoral thesis

## MODEL OF IMPROVING ENVIRONMENTAL MANAGEMENT SYSTEM BY MULTI-SOFTWARE

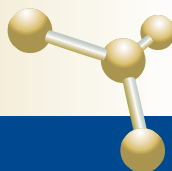
Mentor: Prof. Dr. Zdravko Krivokapić  
Co-mentors: Prof. Dr. Milan Perović;  
Prof. Dr. Stanka Filipović  
University of Montenegro, Faculty of Mechanical  
Engineering in Podgorica

This doctoral thesis presents extensive research on information communication technology (ICT) utilization, specifically concerning the quantitative modelling of environmental aspects.

Utilization of neural networks created on the basis of a large amount of data collected from organizations that are certified with ISO 14001, confirmed the achievement of objective and reliable evaluation of environmental impacts, regardless of the organizational department of activity. Even when the basic demands of ISO 14001 are satisfied, in order to create a system that will provide constant improvement in ecological performance, a broadly based approach to improve a strategic management system, called the Balanced Scorecard, was used.

Based on the experimental evaluation of the models, the author points out that those models that contain two BSC models provide much better results when one of them is oriented only towards environmental protection. Merging results during the writing of this doctoral thesis, the author created a model for improving the environmental management system.

The utilization of software systems in all processes significantly improves business performance and creates conditions for rapid reactions and changes inside and outside organizations.



Doktorska disertacija

## VPLIV SODOBNIH GRADIV IN TEHNOLOGIJ NA OBLIKOVANJE FASADNEGA OVOJA

Mentorica: izr. prof. dr. Martina Zbašnik -  
Senegačnik, univ. dipl. inž. arh.  
Somentor: prof. dr. Borut Juvanec, univ. dipl. inž. arh.  
Univerza v Ljubljani, Fakulteta za arhitekturo

Doktorska disertacija obravnava problematiko sodobnega fasadnega ovoja. Raziskava se osredotoča na proučevanje vpliva sodobnih gradiv in tehnologij na oblikovanje fasadnega ovoja na podlagi tehnološke in vizualne analize fasadnega ovoja in predstavljenih razvrstitev gradiv v družine. Prikazan je fasadni ovoj skozi tri razvojne faze. Predpostavljena je četrta faza – fasada prihodnosti. Zanikanje tektonike ter dematerializacija sta pojavi, ki sta že in bosta še naprej preoblikovala podobo sodobne arhitekture. Osvetljen je pojav novih geometrij, ki so možne z uporabo računalniških tehnologij. Novi pristopi k oblikovanju z generativnimi metodami omogočajo nastanek novih arhitekturnih oblik.

V doktorski disertaciji so določeni usmerjevalci razvoja sodobnega fasadnega ovoja, ki so razdeljeni v tri večje skupine: tehnološki, ekonomski in estetski vplivi.

Potrjena je hipoteza, da je vizualnost fasadnega ovoja odvisna predvsem od lastnosti gradiv in tehnologije gradnje. Neslutene oblikovalske potencialne predstavljajo pametna gradiva in izdelki, nanogradiva, biomimetična gradiva, tehnične tekstilije in membrane, pa tudi konvencionalna gradiva, ki so z razvojem tehnologije obdelave pridobila popolnoma nove, do sedaj nepredstavljive lastnosti.

V zaključku doktorske disertacije se razpravlja o pomenu rezultatov za nadaljnji razvoj fasadnega ovoja. Podani so predlogi in usmeritve k nadaljnjim raziskavam, omenjene pa so tudi omejitve, ki zavirajo proces razvoja.

Doctoral thesis

## THE INFLUENCE OF CONTEMPORARY MATERIALS AND TECHNOLOGIES ON THE BUILDING ENVELOPE

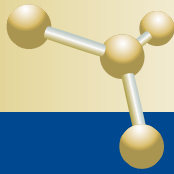
Mentor: Associate Prof. Dr. Martina Zbašnik-  
Senegačnik, BSc (Architecture)  
Co-mentor: Prof. Dr. Borut Juvanec, BSc  
(Architecture)  
University of Ljubljana, Faculty of Architecture

*This doctoral thesis deals with the complex issues of the contemporary façade. Based on technological and design analyses of the building envelope, as well as on the classification of building materials, the research deals with the study of contemporary building materials and technologies and their influence on the building envelope. The building envelope is analysed during three phases. The fourth phase – the future building envelope is presumed. The denial of tectonics and dematerialization are phenomena that have already changed contemporary architecture. The usage of new computational techniques has contributed enormously to the architectural design. With CAD/CAM technologies a new geometry can be performed enabling the formation of a new architecture or building envelope.*

*In the doctoral dissertation, the given guidelines for the future development of the building envelope are in accordance with the ideas of environmentally sustainable building practices.*

*The research hypothesis that the visual effect of the building envelope primarily depends on the building material properties and building technology, is confirmed. Undreamt possibilities evolve when smart materials, such as nano materials, as well as conventional materials with new properties, are used in the facades.*

*The dissertation finishes in the form of a discussion. The possible future development in architecture is outlined. Proposals and directions for further studies, as well as restrictions which may hinder the process of the development, are highlighted.*



Doktorska disertacija

**RAZŠIRITEV NEKOLIZIJSKIH  
RAZELEKTRITVENIH MODELOV  
ZA APLIKACIJO V FUZIJSKO  
RELEVANTNIH IN SPLOŠNIH PLAZMAH**

**Mentor: prof. dr. Jožef Duhovnik  
Sommentor: prof. dr. Siegbert Kuhn  
Univerza v Ljubljani, Fakulteta za strojništvo**

Doktorsko delo predstavlja matematično-numerično razširitev nekolizijskih razelektritvenih modelov v široka temperaturna območja in za primere končne debeline plazemskega plašča, ki omogočajo izpopolnjene aplikacije v fuzijsko relevantnih in splošnih plazmah.

Povzetek lahko strnemo v naslednje točke:

(i) Obstoječi model je razširjen s tako imenovanim končnim  $\epsilon = \lambda D/L$ , kar pomeni, da kvazinevtralnost ni striktno zagotovljena, temveč se uporablja kompletna Poissonova enačba namesto pogoja kvazinevtralnosti.

(ii) Določanje jedra je bilo izvedeno neposredno z uporabo splošnih programskih knjižnic. Profil potenciala je določen z zgoščeno mrežo ne samo ob steni, temveč tudi v središču simetrije tako, da se bo uporabila adaptivna metoda.

(iii) Osnovne hidrodinamske količine, kot so ionska gostota, ionski fluks, ionska energija in temperatura, so bile izpeljane neposredno iz porazdelitve hitrosti na mreži z integracijo, ki je samoadaptivna tako v bližini singularnosti jedra integrala kot tudi v bližini singularnosti električnega polja oz. inverzne vrednosti.

(iv) Izvedena sta dva modela, in sicer v širokem spektru ionskih temperatur z upoštevanjem končne vrednosti  $\epsilon$  in v limitnem primeru  $\epsilon = 0$ .

Doctoral thesis

**EXPANSION OF COLLISIONLESS  
DISCHARGE MODELS FOR  
APPLICATION IN FUSION-RELEVANT  
AND GENERAL PLASMAS**

**Mentor: Prof. Dr. Jožef Duhovnik  
Co-mentor: Prof. Dr. Siegbert Kuhn  
University of Ljubljana, Faculty of Mechanical  
Engineering**

*This thesis presents an extension of the analytical numerical approach to collision-less discharge models into a wide ion-source of temperature ranges, and for finite  $\epsilon = \lambda D/L$ . The results of this computational model will extend the validity of the solution to both fusion-relevance and general plasmas.*

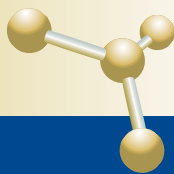
*The author's approach is as follows:*

*(i) Existing models are extended to the so-called 'finite- $\epsilon$ ' case. This means that strict quasi-neutrality is not strictly satisfied unless  $\epsilon$  is strictly zero.*

*(ii) In this approach, the kernel is not approximated but calculated exactly. The grid for calculating potential profile is refined not only at the wall of the system but also in the center of symmetry.*

*(iii) The basic hydrodynamic quantities, like ion density, in out-flux, directional energy and temperature, are derived directly from the velocity distribution on a grid which is self-adaptive near the singularities of the integral kernel as well as near the singularities of the electric field.*

*(iv) Two types of results are obtained, namely for a wide spectrum of ion temperatures, with  $\epsilon = 0$ , and for several temperatures with  $\epsilon$  finite.*



Doktorska disertacija

### MODELIRANJE RECIKLIRANEGA IZOLATIVNEGA MATERIALA POLIURETANA IN BETONA NA OSNOVI AGREGATA IZ LAHKO PIHANEGA STEKLA ZA IZBOLJŠANJE ENERGETSKE UČINKOVITOSTI ZGRADBE

Mentor: prof. dr. Jurij Kropc  
Sommentor: izr. prof. dr. Darko Goričanec  
Univerza v Mariboru, Fakulteta za kemijo in  
kemijsko tehnologijo

Na učinkovito rabo energije v stavbah vpliva množica dejavnikov: od vključevanja vidika trajnostnega razvoja v načrtovanju, vključevanja okoljskega menedžmenta v poslovne procese gradnje, skrbi za naravne vire in njihovo učinkovito rabo, doseganja tehničnih lastnosti gradbenih proizvodov do zmanjševanja gradbenih odpadkov z načinom trajnostne proizvodnje in porabe surovin.

Uporaba recikliranih gradbenih in izolirnih materialov v gradnji in s tem učinkovitost rabe energije v stavbah predstavlja enega od zelo perspektivnih načinov za varčnejšo trajnostno rabo materialov in energije.

V nalogi je predlagan zanimiv model recikliranja gradbenih odpadkov izolacijskega materiala trdega poliuretana in lahkega betona na osnovi agregata iz lahko pihanega stekla s ciljem načrtovanja trajnostnih procesov za doseganje proizvodnje brez odpadkov.

Predlagana rešitev omogoča procesno alternativo, ki je v primerjavi z dosedanjimi rešitvami izboljšana v trajnostnem delovanju. Nastali kompozit je v skladu s Pravilnikom o toplotni zaščiti in učinkoviti rabi energije v stavbah (Ur. l. RS, št. 42/2002) moč uporabiti za toplotno zaščito in učinkovito rabo energije v stavbah.

Doctoral thesis

### MODELING OF RECYCLED ISOLATING MATERIALS FROM HARD POLYURETHANE AND LIGHTWEIGHT CONCRETE WITH AGGREGATES WITH EXPANDED GLASS FOR IMPROVEMENT ENERGY EFFICIENCY OF BUILDINGS

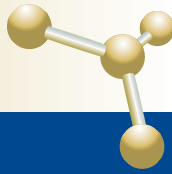
Mentor: Prof. Dr. Jurij Kropc  
Co-mentor: Associate Prof. Dr. Darko Goričanec  
University of Maribor, Faculty of chemistry and  
chemical engineering

*The study of heat protection and efficient use of energy in buildings brings new recognition to the area of planning, performance, and using objects in their life cycle. The efficient use of energy in buildings affects a lot of factors, including the sustainable development aspect in planning, the environmental management aspect in business construction processes, care for natural resources and their efficient use, achieving technical specifications of construction products, and reducing construction waste with a method of sustainable production and raw materials.*

*The use of recycling construction and isolation materials in civil construction and the efficient use of energy in buildings, presents one of the very important methods for efficient and sustainable use of materials and energy.*

*The current work proposes a model of recycling isolating materials, made of hard polyurethane and lightweight concrete, with aggregates containing expanded glass.*

*Results indicate that it is possible to recycle hard polyurethane and lightweight concrete construction waste with aggregates containing expanded glass and in this way achieve production processes without waste and with improved energy efficiency in buildings. In this way composites with new characteristics of density, compressive strength and thermal conductivity is created, conforming to Rules on heat protection and efficient energy use in buildings (National Gazette of Republic of Slovenia No. 42/2002), and can be used for heat protection and efficient use of energy in buildings.*



Doktorska disertacija

## DOLOČANJE PRITISKA RAZPOKE IN OCENA STRUKTURALNE CELOVITOSTI Z RAČUNALNIŠKO-PODPRTIMI STEROMETRIČNIMI MERITVAMI

Mentor: prof. dr. Aleksandar Sedmak  
Somentorja: prof. dr. Dragan Lazić, prof. dr. Nenad Gubelj  
Univerza v Beogradu, Fakulteta za strojništvo

Doktorska disertacija je bila sestavljena iz praktične in numerične analize deformacij gradbenih delov z različnimi konfiguracijami razpok (površinske, notranje) in različnimi načini obremenitve (npr. natezanje, upogibanje, vrtenje, itn.)

Opravljen je bil numerični izračun parametrov pri prelomu (J-integral, KI) in meje obremenitve, ki je bil nato praktično potrjen in opremljen za meritve premika in obremenitve na površini obravnavanih delov. Primerjave numeričnih rezultatov na površini z ustreznimi praktičnimi rezultati so odkrile, da lahko nadzorujemo obnašanje gradbenih delov s površinskimi razpokami in da je možno nadzirati tudi notranje razpoke.

Poskusi so pokazali pričakovano ujemanje numeričnih in praktičnih rezultatov, ki je v primeru površinskih razpok skoraj popolno (1-1). Z združitvijo komercialnih sistemov, računalniških programov, komunikacijske opreme trenutno na trgu, in območjem, ki ga pokriva brezžični sistem so razvili strokovni sistem za dostopanje do statusa in celovitosti struktur. Sistem podpira ploščo tiskanega vezja, ki poleg meritvene opreme omogoča tudi izdelavo stereometričnih optičnih sistemov za meritve obremenitev.

Meritveni postopek je primeren tudi za določanje natančnosti oblike in dimenzij spojev pri panelih, profilacije in drugih pomembnih elementov Trimovih izdelkov.

Doctoral thesis

## STRESS DETERMINATION OF CRACK TIP, AND EVALUATION OF STRUCTURAL INTEGRITY, BY COMPUTERISED STEREO-METRIC MEASUREMENT

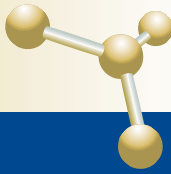
Mentor: Prof. Dr. Aleksandar Sedmak  
Co-mentors: Prof. Dr. Dragan Lazić, Prof. Dr. Nenad Gubelj  
University of Belgrade, Faculty for Mechanical Engineering

The case study was conducted with experimental and numerical analyses on the deformation of construction components with different configurations of cracks (surface, internal) and different types of load (e.g., straining, bending, torsion, etc.).

Fracture parameters (J-integral, KI) and the load limit are calculated numerically, experimentally verified, and equipped for measuring displacement and strain at the surface of the examined components. Comparisons between the numerical results on the surface and corresponding experimental results showed that it is possible to monitor the behaviour of construction components with surface cracks and that it is also possible to monitor inside the cracks.

Experiments in the thesis showed the expected match between numerical and experimental results, which is almost completely (1-1) for surface cracks. Combining commercial systems and computer programs, available communication equipment on the market, and territorial coverage using wireless signals, a specialist system for assessing the status and integrity of structures was developed. The system seems to support the circuit court, which, in addition to conventional measuring equipment, gives you a chance to make a stereo metric optical system for measuring strain.

The method of measurement would be also useful in determining the correctness of the shape and dimensions of panel joints, profiling, and other important elements of Trimo products.



## DANIJEL MOČIBOB

Doktorska disertacija

### STEKLENI PANEL PRI LOKALNEM IZBOČENJU ZARADI STRIŽNE OBREMENITVE – UPORABA STEKLA V STABILIZACIJI KONSTRUKCIJ

Mentor: prof. dr. Jean-Paul Lebet  
Somentor: Michel Crisinel, dipl. inž.  
EPFL – Švicarski Državni inštitut za tehnologijo,  
Lozana (Švica)

Osnovna naloga disertacije je razumevanje lokalnega izbočenja pri strigu točkovno in linijsko podprtega steklenega panela pri delovanju strižne sile v ravnini panela, kot tudi da razišče potencialno uporabo steklenega panela kot konstrukcijskega elementa v popolnoma transparentnih paviljonih, ki so zadnji trendi sodobne arhitekture.

Najpomembnejši prispevek disertacije je analiza lokalnega obnašanja veznih elementov in globalnega obnašanja steklenega panela pri strižnem lokalnem izbočenju skozi Eksperimentalne raziskave, Numerično modeliranje in Parametrsko analizo.

Disertacija demonstrira koriščenje fasade kot nosilne konstrukcije, ki lahko veliko privarčuje pri gradnji (manjša teža konstrukcije), izboljša nosilno obnašanje konstrukcije (večja globalna stabilnost) in poveča celotno arhitektonsko estetiko (lahka, čista konstrukcija).

Doctoral thesis

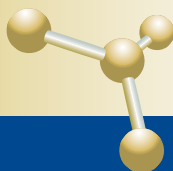
### GLASS PANEL UNDER SHEAR LOADING- USE OF GLASS ENVELOPES IN BUILDING STABILIZATION

Mentor: Prof. Dr. Jean-Paul Lebet  
Co-mentor: Michel Crisinel, BSc (Eng.)  
EPFL - Ecole Polytechnique Federale de Lausanne  
(Switzerland)

*The main purpose of this doctoral thesis is to understand the shear buckling behaviour of point supported and linear supported glass panels, subjected to in-plane shear force, as well as to investigate their potential use as a structural element in fully transparent pavilions, such as the latest trends in contemporary architecture.*

*The main contribution of the thesis is that the local behaviour of the connection devices and the global behaviour of the glass panel under in-plane shear force are studied by means of: experimental investigations, numerical modelling, parametric analyses.*

*The thesis demonstrates that exploiting facades in structural manner can economize the building (less materials), improve the building structural behaviour (higher global stability) and increase the overall architectural aesthetics (lightweight, clearness).*



Doktorska disertacija

## ZAPIS STABILNEGA TEHNOLOŠKEGA OKNA PRI INKREMENTALNEM PREOBLIKOVANJU PLOČEVINE

Mentor: prof. dr. Karl Kuzman, univ. dipl. inž.  
Univerza v Ljubljani, Fakulteta za strojništvo

V doktorski disertaciji so predstavljene raziskave na področju asimetričnega eno-točkovnega inkrementalnega preoblikovanja pločevine s stališča načrtovanja stabilnega procesa preoblikovanja.

Uporabljeno je bilo empirično modeliranje. Ker so takšne analize običajno relativno drage, sta v nadaljevanju razvita dva modela za predhodno napovedovanje preoblikovalnega procesa, in sicer analitični model in numerični model. Na podlagi ocene kakovosti modelov je bilo ugotovljeno, da razviti modeli zadovoljivo napovedujejo rezultate preoblikovanja in da jih je mogoče uporabiti pri definiranju stabilnega tehnološkega okna. Kljub vsemu pa razviti modeli ne omogočajo definiranja mejnih vrednosti preoblikovanja, zaradi česar je izvedba dejanskih preizkusov neizogibna. Zaradi tega in zaradi izredno dolgotrajne izdelave izdelka s tehnologijo inkrementalnega preoblikovanja je razvit avtonomen sistem za sprotno identifikacijo porušitve preizkušanca, ki predstavlja vsestransko orodje za identifikacijo lokacije in časa nastanka mejne preoblikovalnosti brez posredovanja operaterja.

Na koncu je, glede na rezultate izvedenih raziskav, predstavljen postopek za definiranje stabilnega tehnološkega okna, s čimer je omogočen jasen vpogled v področje varnega preoblikovanja.

Doctoral thesis

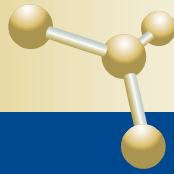
## THE DEFINITION OF A STABLE TECHNOLOGICAL WINDOW BY INCREMENTAL SHEET METAL FORMING

Mentor: Prof. Dr. Karl Kuzman, BSc (Eng.)  
University of Ljubljana, Faculty of Mechanical Engineering

*In this doctoral thesis, asymmetric single-point incremental sheet metal forming technology is discussed from the definition of stable and safe-forming procedure point of view.*

*Empirical modelling has been used. Because such analyses are very expensive usually due to extensive experimental work, two models to predict forming results in advance were proposed, which are a numerical and an analytical model. On the basis of quality assessment of developed models it was established that they predict analysed output values relatively well and that they can be applied for definition of a stable technological window in addition. On the other hand the models do not enable determination of forming limits, so the executions of real experimental tests are inevitable. For this reason, and due to the fact that incremental technology requires relatively long production time, an autonomous on-line system for fracture identification during the forming process is developed, representing a versatile tool to identify location and time of the forming limit without operator influences and presence.*

*Finally, the procedure to define a stable technological window is proposed according to all the investigations made, in order to get an overall insight into a safe forming area.*



Doktorska disertacija

## VPLIV ZNAČILNOSTI VRVNEGA POGONA NA DELOVANJE HAPTIČNEGA MEHANIZMA

Mentor: red. prof. dr. Srečko Godež  
Somentorja: red. prof. dr. Jože Flašker,  
izr. prof. dr. Karl Gotlih  
Univerza v Mariboru, Fakulteta za strojništvo

Haptični vmesnik je naprava, ki s povratno silo uporabniku omogoča vključenost v navidezno ali oddaljeno okolje oziroma raziskovanje v tem okolju s podrejeno napravo. Naprave, ki so kompatibilne z magnetno resonanco, imajo zaradi magnetnega polja določene specifične strukturne in obratovalne značilnosti. Oblikovan je bil tudi kinematični model, ki omogoča izdelavo optimalnejšega mehanizma z enakomerno porazdeljenimi silami in hitrostmi.

V doktorski disertaciji je predstavljen teoretični model vravnega pogona za haptični mehanizem s tremi prostostnimi stopnjami, ki lahko deluje v okolju magnetne resonance. Obravnavane so togost pogona z upoštevanjem histereznega obnašanja in obratovalne lastnosti ob uporabi različnih dimenzij vrvi in vrvenic. Prav tako so predstavljene prilagoditve za zagotovitev vravnega pogona, gnanega z elektromotorji, ki deluje v okolju magnetne resonance.

Predstavljeno delo podaja pristop konstruiranja haptičnega sistema, ki pa se lahko uporabi tudi pri konstruiranju natančnih haptičnih pogonov in drugih industrijskih naprav, predvsem na področjih, kjer sta potrebni optimizacija delovnega prostora robota in velika natančnost pozicioniranja.

Doctoral thesis

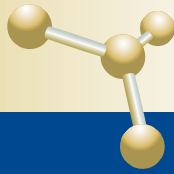
## THE INFLUENCE OF CABLE DRIVE CHARACTERISTICS ON PERFORMANCE OF A HAPTIC MECHANISM

Mentor: Prof. Dr. Srečko Godež  
Co-mentors: Prof. Dr. Jože Flašker,  
Associate Prof. Dr. Karl Gotlih  
University in Maribor, Faculty of Mechanical Engineering

A haptic interface is a force feedback device, which enables its user to interact within a virtual world or a remote environment explored by a slave device. Magnetic resonance (MR) compatible devices have certain specific structural and operational properties, because of the magnetic field. They were designed as a kinematic model, which leads to optimization of the mechanism with a uniform distribution of velocities and forces.

This doctoral thesis deals with the theoretical modeling of a cable drive for a 3 DOF MR compatible haptic mechanism. It focuses on an appropriate cable preload, hysteresis behavior, and driving performance, when using different cables and drum diameters. The thesis also introduces certain adaptations, which have been done to enable MR compatibility of a cable drive driven by electric motors.

The presented thesis provides a haptic system design approach, which can also be used in constructing precise haptic drives and other industrial plants, mainly in the fields which require optimization of the robot workspace and high precision positioning.



Doktorska disertacija

## OCENA ZANESLJIVOSTI SPOJEV NOSILEC-STEBER IZVEDENIH S KOTNIKI

Mentor: prof. dr. sc. Darko Dujmović  
Univerza v Zagrebu, Fakulteta za gradbeništvo

Avtor je v delu raziskoval obnašanje kotnikov pri upogibu ter obnašanje momentnih vijčnih spojev, izvedenih s kotniki. Naloge se je lotil zelo obširno. Izdelani so bili številni laboratorijski testi in numerične analize.

Izbrana tema znanstvene naloge je zelo aktualna glede na to, da na mednarodni ravni poteka proces uvajanja sodobnega pristopa dimenzioniranja jeklenih konstrukcij. Obravnavana tema oz. problematika do sedaj ni bila analizirana na znanstveno argumentiran način, kot je to naredil avtor naloge.

Rezultati doktorskega dela predstavljajo znanstveno argumentirana izhodišča za sprejetje sklepov o nadaljnjih raziskavah analiziranih tipov kotnikov ter za odločitve na praktični ravni o oceni zanesljivosti priključkov, dimenzioniranih s pomočjo obravnavanih obstoječih in predlaganih teoretičnih modelov. Na osnovi izvedenih verjetnostnih analiz, ki so utemeljene na rezultatih izvedenih laboratorijskih testov, so ovrednoteni obstoječi in predlagani teoretični modeli. Čeprav je naloga visoko strokovna, je praktično usmerjena.

Rezultati naloge so konkretni računski modeli za oceno zanesljivosti delno togih spojev s kotniki. Rezultati so praktično uporabni pri procesu projektiranja jeklenih konstrukcij, predstavljajo pa tudi izhodišča nadaljnjih raziskav.

Doctoral thesis

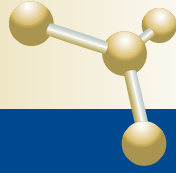
## RELIABILITY ASSESSMENT OF BEAM-TO-COLUMN JOINTS WITH CLEATS

Mentor: Prof. Dr. Darko Dujmović  
University of Zagreb, Faculty of Civil Engineering

*The benefits resulting from the partial strength/semi-rigid design of steel frame structures are increasingly recognised today. Such a design approach, consisting in the use of semi-rigid joints with partial strength, is getting more and more attainable and popular.*

*The thesis researches the behaviour of flange cleats in bending as well as the behaviour of the bolted beam-to-column joint with flange cleats that is exposed to bending. Moreover, the research has been extended to include the types of flange cleats with stiffener so far not researched. Extensive experimental testing and numerical analyses of pairs of cleats in tension, and joints with flange cleats, have been conducted. The original models for the assessment of stiffened flange cleats in bending have been developed and by comparing them with the experimental results, the accuracy of the developed models has been confirmed.*

*Taking into consideration the results of the performed experimental testing, and by creating the limit state equations, a probability evaluation of the considered models has been made. The results of the analyses conducted constitute scientifically elaborated bases for making decisions about further investigation of the analysed types of flange cleats and configuration of joints, and for decisions at a practical level regarding the evaluation of reliability of joints, designed according to the considered existing and proposed theoretical models.*



Doktorska disertacija

### VPLETENOST IN OSREDOTOČENOST ZAPOSLENIH NA TEMELJNE VREDNOTE TER VPLIV NA TRAJNOSTNO ODLIČNOST PRI KONKURENČNOSTI NA DOLGI ROK

**Mentor:** prof. Vittorio Cesarotti  
**Somentorja:** prof. Paolo Mancuso, bivši  
generalni izvršni direktor, Chris Lebeer, EFQM  
Univerza v Rimu "Tor Vergata"

Namen disertacije je analizirati nekatere organizacijske strategije, ki podpirajo podjetja pri doseganju trajnostne odličnosti, ki je sestavljena iz zmožnosti podjetja, da zadovolji sedanje potrebe družbenikov in pri tem ne ogrozi svoje zmožnosti, da bi na enak način zadovoljila potrebe družbenikov v prihodnosti.

V raziskavi je posebna pozornost posvečena sodelovanju zaposlenih, saj so glavni cilj te strategije človeški viri, ki predstavljajo bistvo za izpolnjevanje večine strategij in doseganje trajnostne odličnosti. Avtorica najprej poskuša s pomočjo preučevanja literature in podatkov iz prakse ustvariti enkratni okvir referenc na temo novih konceptov za sodelovanje zaposlenih, ki je še vedno v razvojni fazi.

Avtorica po uvodu, sestavljenim iz preučevanja literature in poskusom presežanja omejitev na tem področju, razvije nov model, ki raziskuje tako motivacijo pri sodelovanju zaposlenih ter rezultate, kot tudi odnos med le-timi ter poslovnimi rezultati, da bi združili napore za skupne cilje.

Ta nov pogled postavi sodelovanje zaposlenih kot organizacijski vmesni proces, ki ustvarja vrednost za podjetje ter medsebojno deluje ter podpira druge strateške procese.

Model in orodje sta bila potrjena v prilogi disertacije.

Doctoral thesis

### EMPLOYEE ENGAGEMENT AND FOCUS ON CORE VALUES AS LEVERS OF AN INTEGRATED APPROACH TO SUSTAINABLE EXCELLENCE FOR COMPETITIVENESS DURING A LONG PERIOD

**Mentor:** Prof. Vittorio Cesarotti  
**Co-mentors:** Prof. Paolo Mancuso, Former CEO,  
Chris Lebeer, EFQM  
University of Rome "Tor Vergata"

*The purpose of this thesis is to analyze some organizational strategies that support companies in achieving sustainable excellence, which is the company's ability to satisfy stakeholder needs without compromising its ability to satisfy future stakeholder needs in the same way.*

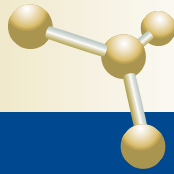
*In particular the research focuses its attention on employee engagement (EE), because this is the strategy focused on human resources, the life blood for realizing most strategies and for achieving sustainable excellence.*

*At first the thesis tries to build a unique reference framework on the new concept of EE, still now in its evolution phase, through a study of literature's and practitioner's state of the art.*

*Starting from a literature study and trying to overcome these limits, the research has developed a new model that has the purpose not only to investigate both EE drivers and outcomes, but also the relationship between them and business results, in order to align efforts towards shared goals.*

*This new point of view sets EE as an organizational transversal process able to create value for a company that interacts, supports, and is supported by other strategic processes.*

*The model and the tool have been validated through a case study application.*



Doktorska disertacija

## EKONOMSKA VARNOST IN EKONOMSKA DIPLOMACIJA: PRIMER TUJIH NEPOSREDNIH INVESTICIJ NOVE LJUBLJANSKE BANKE NA TRGIH ZAHODNEGA BALKANA

Mentor: prof. dr. Marjan Svetličič  
Somentorica: prof. dr. Maja M. Brenčič  
Univerza v Ljubljani, Ekonomska fakulteta

Doktorska disertacija se ukvarja s preučevanjem ekonomske varnosti in ekonomske diplomacije ter odnosa med njima.

V začetku doktorskega dela avtor predpostavlja, da je ekonomska varnost predpogoj za uporabo ekonomske diplomacije. Tako želi v disertaciji dokazati, da obstaja zveza med ekonomsko varnostjo in ekonomsko diplomacijo po načelu *ex ante* – *ex post*. V disertaciji namreč dokazuje, da se ekonomska diplomacija odziva na različne stopnje ekonomske varnosti in tako prehaja od 'zaščitnice premoženja podjetij' do 'pospeševalke gospodarskega sodelovanja med državami'.

Avtor v disertaciji ekonomsko varnost razume kot niz in splet različnih dejavnikov in procesov tako ekonomske kot neekonomske narave. Tako razumevanje ekonomske varnosti je torej širše od klasičnega (samo makroekonomska stabilnost) in je sestavljeno iz štirih komponent: človekove varnosti, socialne varnosti, tehnološke varnosti in makroekonomske stabilnosti. Vse te komponente pa povezuje element politične stabilnosti.

Za razliko od ekonomske varnosti avtor ekonomsko diplomacijo definira kot dano, torej kot odziv na ekonomsko ne-varnost. To je pomembno predvsem zato, da se lahko državni odločevalci (decision-maker) primerno odločajo, ko je treba posredovati na določenem trgu, da bi zavarovali poslovne možnosti in sposobnosti podjetij iz lastne države.

Doctoral thesis

## ECONOMIC SECURITY AND ECONOMIC DIPLOMACY: THE CASE OF DIRECT FOREIGN INVESTMENTS, OF NOVA LJUBLJANSKA BANKA, INTO WESTERN BALKAN MARKETS

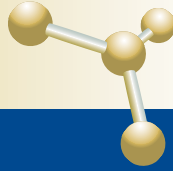
Mentor: Prof. Dr. Marjan Svetličič  
Co-mentor: Prof. Dr. Maja M. Brenčič  
University of Ljubljana, Faculty of Economics

*This doctoral thesis is particularly focused on the study of economic security and economic diplomacy, and the underlying relationship between the two.*

*An initial premise of the thesis states that economic security represents a pre-condition for economic diplomacy. The goal of the thesis is to prove the *ex ante* – *ex post* (forecast - results) relationship between economic security and economic diplomacy, and aims to demonstrate that economic diplomacy responds to different levels of economic security, thus passing from the role of »protector of company property« to one of »promoter of economic cooperation among states«.*

*Economic security is conceptualized as a set of factors and processes of economic and non-economic nature. The author's understanding of economic security is therefore broader than classical, which implies only macro-economic stability, and represents the sum of four constituent parts, namely: human security, social security, technological security, and macro-economic stability. All these components are bound through political stability.*

*Contrary to economic security, economic diplomacy is defined here as a given fact and therefore a response to economic non-security. This is of great importance for state decision-makers, who need to decide adequately when to intervene in a given market, to protect business interests, and the capacities of companies in their own state.*



Doktorska disertacija

## MODELIRNO OKOLJE ZA GRADNJO DISTRIBUIRANIH PROIZVODNIH SISTEMOV

Mentor: izr. prof. dr. Peter Butala, univ. dipl. inž.  
Univerza v Ljubljani, Fakulteta za strojništvo

V doktorski disertaciji je identificirana potreba po primerni metodološki podpori in orodjih za modeliranje, strukturiranje in kontrolo prihodnjih generacij proizvodnih sistemov. Ključno vprašanje je sposobnost pravočasne celovite izgradnje oz. adaptacije modela mrežnega proizvodnega sistema, za katerega bomo sposobni predvideti obnašanje v prihodnosti in zagotavljati ustrezno krmiljenje z namenom doseganja zelenih rezultatov v izbranem okolju.

Naloga je multidisciplinarna in zajema poleg poznavanja značilnosti proizvodnih sistemov še dognanja s področij proizvodne kibernetike, poslovnih procesov, metod modeliranja, simulacije in analize, podatkovnih baz ter načrtovanja informacijskih sistemov. Tema obsega razvoj metod, sistema in orodij za dinamično mrežno načrtovanje ter analizo in optimizacijo sodobnih oblik proizvodnih sistemov.

Generična zasnova razvitega ADMO okvirja omogoča uporabo na širokem področju načrtovanja visoko serijskih, projektno vodenih, mrežnih ter porazdeljenih proizvodnih sistemov. Z odprto arhitekturo je možen nadaljnji sistematičen razvoj in vključevanje novo razvitih gradnikov ter njihovo informacijsko povezovanje v mrežnem okolju na osnovi spletnih servisov, ki predstavljajo neodvisni vhodno-izhodni vmesnik.

Doctoral thesis

## MODEL ENVIRONMENT FOR CONSTRUCTION OF DISTRIBUTED MANUFACTURING SYSTEMS

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University of Ljubljana, Faculty of Mechanical  
Engineering

*In this work, a need for adequate methodological support and tools for modelling, structuring, and control of the next generation of manufacturing systems is recognized.*

*The Adaptive Distributed Modelling Framework (ADMO) for collaborative design and operations of network manufacturing systems is presented. In manufacturing networks, several autonomous partners participate in the dynamic design of a manufacturing system, its implementation, and adaptation. In this context collaborative modelling, structuring, and control in distributed manufacturing environment play a vital role.*

*The proposed modelling framework introduces the common modelling space and enables a collaborative definition of modelling building blocks, model design, simulation, and operational support of distributed manufacturing systems in a dynamic environment - which is the realistic nature of the global manufacturing.*

*The prototype of the framework is elaborated in a case study.*

Doktorska disertacija

## SINTEZA KONSTRUKCIJE JEKLENIH HAL Z MEŠANIM CELOŠTEVILSKIM NELINEARNIM PROGRAMIRANJEM

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Univerza v Mariboru, Fakulteta za gradbeništvo

V doktorski disertaciji je predstavljen celovit pristop k sočasnemu optimiranju mase, topologije, diskretnih materialov in standardnih prerezov konstrukcije jeklenih hal.

Optimizacijski problemi sinteze konstrukcij jeklenih hal so kombinirani diskretno-zvezni in so kot taki obsežni, nekonveksni in nelinearni. Z namenom pospešitve in omogočanja konvergence MINLP optimizacijskega problema je bila razvita trifazna MINLP strategija s presejevanjem različnih diskretnih alternativ.

Z uporabo predlagane optimizacijske metode MINLP je bila izvedena sinteza konstrukcije treh različnih tipov jeklenih hal: konstrukcije hale, sestavljene iz vroče valjanih HEA profilov, iz vroče valjanih IPE profilov, in konstrukcije hale, sestavljene iz mešanega nabora IPE in HEA profilov. Za vsak tip konstrukcije hale je bilo izvedeno parametrično optimiranje MINLP. Z MINLP pridobljeni optimalni rezultati so obsegali minimalno maso konstrukcije, optimalno topologijo, diskretne materiale in standardne prereze konstrukcije hale.

Na koncu je bila izvršena primerjava rezultatov med tremi tipi konstrukcij jeklenih hal. Na osnovi teh primerjav smo izrisali diagrame za optimalen dizajn konstrukcije jeklenih hal, s pomočjo katerih bo lahko inženir za izbran razpon, višino in obtežbo hale določil optimalen tip konstrukcije, število konstrukcijskih elementov (topologijo), konstrukcijsko jeklo (material) in standardne prereze konstrukcijskih elementov.

Doctoral thesis

## SYNTHESIS OF STEEL BUILDINGS WITH MIXED-INTEGER NONLINEAR PROGRAMMING

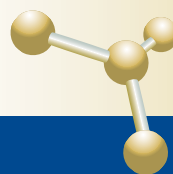
Mentor: Prof. Dr. Stojan Kravanja  
University of Maribor, Faculty of Civil Engineering

*This doctoral thesis presents the simultaneous mass, topology, discrete material, and standard cross-section optimization of a single storey steel building. The single storey steel building optimization problems are comprehensive, non-convex, and highly nonlinear. Therefore the author proposed the Linked Three Phase MINLP Strategy in order to accelerate convergence of the MINLP optimization problem.*

*Three different types of single storey building structures have been synthesised according to the proposed MINLP approach: a steel building structure made from HEA cross-sections, a steel building structure made from IPE cross-sections, as well as a steel building structure made from both IPE and HEA cross-sections.*

*The optimal solution of the single storey steel building comprises the obtained minimal structure mass, optimal topology, discrete materials, and standard cross-sections.*

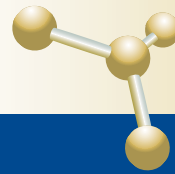
*Finally a comparison between the obtained optimal results of the three different steel buildings structure types is made. Based on this comparison, diagrams for an optimal building design are made. For the defined building's span, height, and imposed load, the comparative diagrams presented can be applied for choosing the optimal type of the single storey steel buildings, the optimal number of structural elements (topology), the optimal quality of steel (material), and the optimal standard cross-sections of the elements.*



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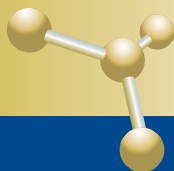
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