SLOVESNA PODELITEV DIPLOM, MAGISTRSKIH DIPLOM IN PROMOCIJA DOKTORJEV ZNANOSTI UNIVERZE V NOVI GORICI

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  Naslov diplomskega dela: *The role of logistics companies in promoting sustainable transport and reducing carbon emissions in supply chains*

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  Naslov diplomskega dela: *Setup of a Surface-Mount Technology line*

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  Naslov magistrskega dela: *Investigation of the Potential of Waste Gasification Systems in Achieving Sustainable Waste Management Practices and Exploring Their Potential to Contribute to the Circular Economy*

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- **Valentina Štanta**

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- **Anja Žnidarčič**
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Fakulteta za vinogradništvo in vinarstvo

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Dodiplomski študijski program
Digitalne umetnosti in prakse

- **Anja Viktoria Peršić**
  Mentorja: *doc. Tadej Žnidarčič in doc. dr. Sarival Sosič*
  Naslov teme praktičnega dela: *Pop kultura: City as my playground*
  Naslov teme pisnega dela: *Pop kultura - kaj bi bili moda in fotografija danes brez pop kulture?*

- **Marcel Kump**
  Mentorja: *doc. Tadej Žnidarčič in Luka Dekleva*
  Naslov teme praktičnega dela: *Življenje kuharja*
  Naslov teme pisnega dela: *Zgodovinski pregled dokumentarne fotografije in njenega razvoja*

Magistrski študijski program Medijske umetnosti in prakse

- **Luka Carlevaris**
  Mentorja: *doc. Tadej Žnidarčič in Luka Dekleva*
  Naslov teme praktičnega dela: *Accelerato*
  Naslov teme pisnega dela: *Vpeljevanje readymade-a in destrukcije v konceptualno fotografijo*

Fakulteta za podiplomski študij

Promocija doktorjev znanosti

Doktorski študijski program Materiali

- **Tina Ročnik Kozmelj**
  Mentorja: *izr. prof. dr. Miha Grilc in dr. Edita Jasiukaityte Grojzdek*
  Naslov teme disertacije: *Reaction mechanism and microkinetics of heterogeneously catalysed lignin depolymerisation and (de)functionalization*

Lignin, kompleksen aromatski polimer del lignocelulozne biomase, je obetaven obnovljiv vir za proizvodnjo kemikalij in materialov z aromatsko strukturo. Vendar njegova kompleksna struktura, depolimerizacija in valorizacija predstavljajo velike izzive pri učinkoviti pretvorbi v produkte z visoko dodano vrednostjo.
Tina se je v sklopu svoje doktorske disertacije osredotočila na razumevanje procesov depolimerizacije lignina, predvsem na cepitev eterskih vezi, ki je ključna za razgradnjo tega kompleksnega polimera. S sistematičnim pristopom je povezala rezultate študij na modelnih komponentah lignina z eksperimentalnimi podatki pridobljenimi na dejanskih ligninskih vzorcih. Preučevala je hidrodeoksigenacijo, vpliv strukturnih lastnosti lignina ter optimizacijo reakcijskih pogojev za njegovo učinkovito depolimerizacijo.

Izvedenih je bilo več eksperimentalnih sklopov z uporabo različnih ligninov, kateri produkti so bili analizirani s tehnikami plinske (GC-MS) in tekočinske (SEC) kromatografije ter naprednimi NMR analizami. Posebno pozornost je Tina namenila tudi določanju kinetičnih parametrov, ki so opisali reakcijske poti in omogočili boljše načrtovanje procesov. Rezultati so pokazali, da stopnja etoksilacije in vsebnost eterskih vezi močno vplivata na učinkovitost depolimerizacije, kar je ključna ugotovitev za optimizacijo prihodnjih procesov.
Tina je s svojim doktorskim delom bistveno prispevala k boljšemu razumevanju kemije lignina in omogočila razvoj bolj usmerjenih strategij za njegovo valorizacijo pri konceptu trajnostnih biorafinerij. Doktorsko delo predstavlja pomemben korak k učinkovitejši uporabi in izrabi lignina kot vira za pripravo obnovljivih materialov.

Lignin, a complex aromatic polymer derived from lignocellulosic biomass, is a promising renewable resource for the production of chemicals and materials with an aromatic structure. However, its complex nature, depolymerisation and valorisation pose significant challenges for efficient conversion into high value-added products.
As part of her PhD thesis, Tina focused on understanding the processes involved in lignin depolymerisation, in particular the cleavage of ether bonds, which is crucial for breaking down this complex polymer. Using a systematic approach, she linked the findings from studies on lignin model compounds with experimental data obtained from actual lignin samples. She investigated hydrodeoxygenation, the influence of the structural characteristics of lignin and the optimisation of reaction conditions for efficient depolymerisation.
Several experimental studies were carried out with different lignin samples whose products were analysed using gas chromatography-mass spectrometry (GC-MS), size-exclusion chromatography (SEC) and advanced NMR techniques. Tina also focussed on the determination of kinetic parameters that described the reaction pathways and enabled better process design. The results showed that the degree of ethoxylation and the content of ether bonds significantly affected the efficiency of lignin depolymerisation – an important finding for the optimisation of future processes.
With her doctoral thesis, Tina made an important contribution to the understanding of lignin chemistry and enabled the development of more targeted strategies

for its valorisation within the concepts of sustainable biorefineries. Her dissertation is an important step towards a more efficient use and valorisation of lignin as a resource for the production of renewable materials.

- **Rok Šivec**
  Mentorja: *izr. prof. dr. Miha Grilc in doc. dr. Matej Huš*
  Naslov teme disertacije: *Catalytic hydro(deoxy)genation of furfural and modelling of its reaction kinetics*

Doktorska disertacija Roka Šivca naslavlja kompleksno katalitsko pretvorbo bio-osnovanega furfurala v produkte z visoko dodano vrednostjo v trifaznem reaktorju z goščo. Z uspešno integracijo laboratorijskih raziskav ter celovitega kinetičnega in ab-initio modeliranja preko več ravni je bil razvit podroben mikrokinetični opis procesa, ki upošteva tako zakone kvantne kemije, kot makroskopske fenomene termodinamike, prenosa snovi, ter kinetike adsorpcije in reakcij na katalitski površini različnih katalizatorjev in nosilcev.
Ključen preboj predstavlja vzpostavitev reakcijskega mehanizma vzporednih in zaporednih reakcij, ki se uporablja za več monometalnih katalizatorjev (Pd, Pt, Re, Ru, Rh, Ni, Cu) in je potrjena s teorijo gostotnega funkcionala (DFT). Model kvantitativno opisuje kinetiko hidrogeniranja in hidrodeoksigenacije ter napoveduje selektivnost reakcije na podlagi pokritosti površine z vodikom in interakcij med kovino in nosilcem, kjer se Rok tudi kot eden prvih raziskovalcev na področju opira na modeliranje eksperimentov temperaturno programirane desorpcije (TPD). Razviti deskriptivni model je bil uporabljen tudi v napovedne namene in je omogočil in silico optimizacijo reakcijskih pogojev, kar usmerja izbiro katalizatorja in reakcijskih pogojev za najvišje dobitke tarčnih produktov.
Doktorsko delo Roka Šivca ponuja dragocen vpogled v sistematičen razvoj metodologije za fundamentalno razumevanje katalitskega procesa. Ta s svojo robustnostjo prav tako omogoča optimizacijo procesov na dotičnem področju katalitske nadgradnje furfurala kot tudi širše na drugih področjih heterogene katalize.

The PhD thesis of Rok Šivec addresses the complex catalytic conversion of bio-based furfural to high value-added products in a three-phase slurry reactor. By successfully integrating laboratory investigations and comprehensive kinetic and ab-initio modelling over several levels, a detailed microkinetic description of the process has been developed, which takes into account both the laws of quantum chemistry and the macroscopic phenomena of thermodynamics, mass transfer, and the kinetics of adsorption and reactions on the catalytic surface of different catalysts and supports.
A key breakthrough is the establishment of a reaction mechanism of parallel and sequential reactions applicable to several monometallic catalysts (Pd, Pt, Re, Ru, Rh, Ni, Cu), validated by density functional theory (DFT). The model quantitatively describes the kinetics of hydrogenation and hydrodeoxygenation and predicts the selectivity of the reaction based on hydrogen surface coverage and metal-support interactions, where Rok is also one of the first researchers in the field to rely on modelling of temperature-programmed desorption (TPD) experiments. The developed descriptive model has also been used for predictive purposes and has enabled in silico optimisation of the reaction conditions, which guides the selection of catalyst and set of reaction conditions for the highest yields of the target products.
The PhD thesis of Rok Šivec offers valuable insights into the systematic development of a methodology for a fundamental understanding of the catalytic process. Its robustness also allows for process optimisation in the field of catalytic furfural upgrading as well as more broadly in other areas of heterogeneous catalysis.

- **Ana Jakob**
  Mentor: *izr. prof. dr. Miha Grilc*
  Naslov teme disertacije: *Modelling-assisted optimisation of hemicellulose-derived monosaccharide valorization*

Hemiceluloza predstavlja enega od treh ključnih biopolimerov lignocelulozne biomase. Njeni monosaharidi gradniki imajo velik potencial za proizvodnjo kemikalij z visoko dodano vrednostjo. Tako pentoze, kot sta ksiloza in arabinoza lahko pretvorimo v furfural, med tem ko heksoze, vključno z glukozo, galaktozo in manozo lahko pretvorimo v hidroksimetilfurfural (HMF) in levulinsko kislino.

Doktorsko delo Ane Jakob sistematično preučuje dehidracijo vseh ključnih sladkornih gradnikov hemiceluloz v šaržnem reaktorskem sistemu v treh sklopih in sicer:
- brez katalizatorja
- s homogenim katalizatorjem
- z materiali za heterogeno katalizo, ki izkazujejo kislinske lastnosti

Dehidracija pentoz in heksoz v preprostih hidrotermalnih pogojih, ni razkrila le razlik v reaktivnosti posameznih monosaharidov, temveč je hkrati vodila do presenetljivo visokih dobitkov furfurala in HMF-ja. Eksperimentalni podatki iz obsežnega testiranja reaktivnosti so tako omogočili razvoj natančnih deskriptivnih kinetičnih modelov. Vzpostavljeni kinetični model je v nadaljevanju služil kot osnova za optimizacijo reakcijskih parametrov, kar je pripomoglo doseči še višje izkoristke izbranih produktov.

Nadaljnja optimizacija procesnih parametrov, je targetirala relevantne biorafinerijske snovne tokove, kjer v reakcijskem sistemu kot homogena katalizatorja največkrat nastopata žveplova in mravljinčna kislina. Študija z modelnimi mešanicami je bila nadgrajena z valorizacijo industrijsko-relevantnih vzorcev hemiceluloz in po optimizaciji odražala v visokih dobitki furfurala.

V iskanju bolj trajnostnega in reciklabilnega katalizatorja so bili testirani tudi različni zeoliti. Dodatek kovinskih aktivnih mest v vodikovi atmosferi je omogočil učinkovito katalitsko pretvorbo ksiloze v tetrahidrofurfuril alkohol, medtem ko je dodatek vode kot so-topila popolnoma zavrl reakcije dehidracije in omogočil selektivno tvorbo ksilitola.

Doktorska disertacija Ane Jakob pomembno prispeva k področju valorizacije biomase in s tem omogoča napredek pri proizvodnji kemikalij z dodano vrednostjo. Predstavlja prvo celovito študijo, ki je sistematično preučila tako katalitsko in ne-katalitsko dehidracijo petih relevantnih monosaharidov, obširni eksperimentalni opus pa je predstavljal zgolj temelj in predpogoj za podrobno kinetično študijo in nadaljnjo optimizacijo procesa.

Hemicellulose is one of the three key biopolymers of lignocellulosic biomass. Its monosaccharide building blocks have great potential for the production of value-added chemicals. Pentoses such as xylose and arabinose can be converted to furfural, while hexoses including glucose, galactose and mannose can be converted

to hydroxymethylfurfural (HMF) and levulinic acid.
Ana Jakob's PhD thesis systematically investigates the dehydration of all the key sugar building blocks of hemicelluloses in a batch reactor system in three strands, namely:
- without catalyst
- with homogeneous catalyst
- with heterogeneous catalyst materials exhibiting acidic properties
Dehydration of pentoses and hexoses under simple hydrothermal conditions not only revealed differences in the reactivity of the individual monosaccharides, but also led to surprisingly high yields of furfural and HMF. Experimental data from extensive reactivity testing thus allowed the development of accurate descriptive kinetic models. The kinetic model established served as a basis for further optimisation of the reaction parameters, which helped achieving even higher yields of the selected products already without catalyst in aqueous media.
Further optimisation of the process parameters targeted the relevant biorefinery material streams, where sulphuric acid and formic acid are the most common homogeneous catalysts in the reaction system. The study with model mixtures was upgraded by valorisation of industrially-relevant hemicelluloses samples and, after optimisation, reflected in high furfural yields.
Different zeolites were also tested in the search for a more sustainable and recyclable catalyst. The addition of metal active sites in a hydrogen atmosphere allowed efficient catalytic conversion of xylose to tetrahydrofurfuryl alcohol, while the addition of water as a co-solvent completely inhibited the dehydration reactions and allowed the selective formation of xylitol.
Ana Jakob's PhD thesis makes an important contribution to the field of biomass valorisation, thus enabling progress in the production of value-added chemicals. It represents the first comprehensive study to systematically investigate both catalytic and non-catalytic dehydration of five relevant monosaccharides, and the extensive experimental work was only the foundation and prerequisite for a detailed kinetic study and further optimisation of the process.

Doktorski študijski program Fizika

- **Knarik Yeritsyan**
  Mentor: *prof. dr. Artem Badasyan*
  Naslov teme disertacije: *Modeling of solvent role in protein folding experiments*

Doktorska disertacija Knarik Yeritsyan se posveča Modeliranju vpliva topil pri zvijanju beljakovin. Temelji na modificiranem modelu Zimm-Bragg (ZB), ki služi kot osnovni pristop pri raziskavih konformacijskih prehodov v biopolimerih in dokazano opisuje pojave, kot so hladna denaturacija in prehodi vijačnica-klobčič. Dr. Yeritsyan je v svojem doktorskem delu razvila, računalniško implementirala teoretske dosežke v prakso obdelave eksperimentalnih podatkov na področju zvijanja beljakovin, pridobljenih s krožnim dihroizmom in diferencialno skenirajočo kalorimetrijo. Pristop omogoča pridobivanje vrednosti parametrov nukleacije in energij vodikove vezi, ki niso na voljo z drugimi metodami. Uspešno je bil preverjen z velikim številom (~50) eksperimentalnih nizov podatkov. Poleg tega je bilo razvito in lansirano brezplačno spletno orodje za obdelavo eksperimentalnih podatkov, povezanih z zvijanjem beljakovin.
Rezultati so bili povzeti v 3 recenziranih publikacijah in poročani na 6 mednarodnih konferencah.
Najino sodelovanje s Knarik se je začelo leta 2016, ko je bila Erasmus študentka 3. letnika na Fakulteti za znanost UNG in je pod mojim mentorstvom uspešno zaključila diplomsko nalogo. Kasneje, leta 2021, sem jo z veseljem izbral za Mlado raziskovalko v svoji skupini. Uspešen in pravočasen zagovor doktorske disertacije je logična posledica njenega trdega dela in predanosti raziskovanju na področju fizike.
Vesel in ponosen sem, da sem sem bil mentor Knarik Yeritsyan, nedvomno bistre znanstvenice nove generacije fizikov. Moje čestitke in najboljše želje, Knarik!

The doctoral dissertation of Knarik Yeritsyan is devoted to Modeling of solvent role in protein folding experiments. It is based on the modified Zimm-Bragg (ZB) model, which serves as a fundamental framework for the conformational transitions in biopolymers and demonstrates its ability to describe phenomena such as cold denaturation and helix-coil transitions, as it was reported earlier.

Dr. Yeritsyan in her thesis developed, computationally implemented and checked the practical applications of the theory to process the experimental data on protein folding obtained from Circular Dichroism and Differential Scanning Calorimetry. The approach allows to extract nucleation parameter values and hydrogen bonding energies, not available with other methods. It has been successfully checked with a large number (~50) of experimental datasets. Furthermore, a free online tool for processing the experimental data related to protein folding has been developed and launched.
The results have been summarized in 3 peer-reviewed publications and reported in 6 international conferences.
Our collaboration with Knarik started in 2016, when she was a 3rd year Erasmus student at School of Science, UNG and had successfully completed her diploma project under my mentorship. Later, in 2021 I was happy to select her for the PhD position in my group. Successful and timely defense of her thesis is a logical consequence of her hard work and devotion to research in Physics.
I am happy and proud for being a mentor of Knarik Yeritsyan, an undoubtedly bright scientist of the new generation of physicists. My congratulations and best wishes, Knarik!

Doktorski študijski program Molekularna genetika in biotehnologija

- **Claudia D'Ercole**
  Mentor: *prof. dr. Ario de Marco*
  Naslov teme disertacije: *Development of molecular methods for the comprehensive evaluation of stress conditions affecting forest trees*

V Nemčiji mentorja doktorske naloge imenujejo Promotionvater/-mutter. Ta izraz nakazuje dolg in naporen proces nastajanja doktorske naloge, pri katerem ima mentor pomembno vlogo, brez katere doktorand ne bi mogel pobrati sadov svojega raziskovalnega dela. Hkrati pa izraz nakazuje na odnos, ki se razvije med mentorjem in študentom, in ki je v marsičem podoben odnosu

med očetom in otrokom. Ta odnos ni preprost; giblje se med skupnim navdušenjem in jezo zaradi nerazumevanja ter med razočaranjem, ki se nato prelevi v veselje. Skratka, gre za močen odnos, ki se skozi čas poglablja in povezuje dve osebi, ki skupaj doživljata intenzivna intelektualna čustva. Mentor poskuša študenta spodbuditi h kar najboljšem razvoju njegovih sposobnosti in mu vliti zaupanje v lastne zmožnosti. Na krajši rok ta pritisk ni vedno dobrodošel, vendar upam, da mi bo Claudia oprostila, če sem kdaj pretiraval.
Ponosen sem nanjo, saj je skozi leta rasla v samozavedanju, avtonomiji ter analitičnih in sinteznih sposobnostih. Ko prištejemo še njene naravne človeške vrline, mi preostane le to, da se ji zahvalim za skupno preživeti čas. V meni ostaja dvojno občutje poslavljanja – po eni strani dobrodošla emancipacija, po drugi pa melanholična ločitev. Na nek način je podobno, kot kadar hči odide od doma, da bi zaživela lastno življenje.

In Germany, the thesis supervisor is called Promotionvater/mutter. The term perhaps wants to allude to the long and painful process of gestation of the thesis work, with the supervisor who has a maieutic and midwife function, indispensable to give birth to the fruit of the doctoral student's work. At the same time, however, the term lends itself to defining the relationship that is created between supervisor and student, in many similar respects to that between father and child. It is not an easy relationship, it veers from shared enthusiasm to anger for the misunderstandings that divide, to disappointment that then turns into joy. In short, it is a strong relationship, which grows and binds over time two people who experience together strong intellectual emotions and where the older person wants to try to push the younger person to find her best resources, to have faith in her own abilities and to exploit them. In the short term, this pressure is not always welcome, but I hope Claudia will forgive me if I have sometimes exaggerated.
I am proud of her, for how she has been able to grow over the years in terms of awareness, autonomy, analytical and synthetic ability. If we then add her natural human qualities, all that remains to say is to thank her for the time spent together. I will be left with the double feeling of farewell, a moment of welcome emancipation but also of melancholic detachment. Like when a daughter leaves you to rightfully make her own life.

Doktorski študijski program
Študiji kulturne dediščine

- **Haisheng Hu**
  Mentorja: *prof. dr. Xavier Greffe in prof. dr. Michela Pace*
  Naslov teme disertacije: *Integrating Cultural Heritage and Urban Subway Infrastructures*
  Spatial Distribution, Value Assessment, and Impacts of the Beijing Metro Line on Cultural Heritage Regional Development

Disertacija analizira prostorsko razporeditev in gospodarski pomen območij kulturne dediščine ob pekinški mreži podzemne železnice s poudarkom na vlogi in izzivih urbane mobilnostne infrastrukture pri varstvu dediščine. Z uporabo metod prostorske analize – med drugim indeksa najbližjega soseda, geografske koncentracije in lokacijske entropije – študija razkriva koncentracijo različnih kategorij dediščine in raziskuje njen odnos s ključnimi linijami podzemne železnice. Ključne linije podzemne železnice delujejo kot prostorske osi, ki omogočajo dostop do dediščinskih območij in tvorijo razpršen, točkovni vzorec povezljivosti. Na podlagi teh izhodišč disertacija vzpostavlja hierarhični okvir za vrednotenje kulturne dediščine, ki temelji na oddaljenosti od referenčnih postaj postaj pri čemer sta historična in umetniška vrednota osrednja kriterija. Ugotovitve kažejo, da so območja dediščine, ki se nahajajo v enem kilometru od postaj podzemne železnice bolj vplivna na okoliška območja, kar poudarja pomen integracije infrastrukture z ohranjanjem kulturne dediščine. Študija prispeva k razumevanju prostorske dinamike kulturne dediščine v urbanih okoljih, saj ponuja model vrednotenja vpliva dediščine znotraj sodobnih infrastrukturnih sistemov in izpostavlja pomen strateške integracije prometne infrastrukture in varstva dediščine. Raziskava ponuja praktične usmeritve za urbaniste, mestne oblasti in varstvene institucije ter zagovarja vzpostavitev tematskih kulturnih poti in vključenost javnosti.

Dissertation explores the spatial distribution and economic relevance of cultural heritage sites along Beijing's metro network, focusing on how urban infrastructure

can both support and challenge heritage preservation. Using spatial analysis tools—including the nearest-neighbor index, geographic concentration index, and location entropy—the study reveals a high concentration of diverse heritage categories and explores its relationsip with key metro lines. Key metro lines form point-based connective corridors that enhance access to cultural sites. Building on this, the research proposes a hierarchical evaluation framework assessing the value of heritage based on proximity to metro stations, with historical and artistic significance as primary criteria.
Findings show that heritage sites located within one kilometre of metro stations exert greater influence on their urban surroundings, emphasizing the importance of strategically aligning transport infrastructure with heritage preservation. The study offers practical guidance for urban planners, urban authorities, and cultural institutions, advocating for thematic cultural routes to enrich urban cultural tourism and public engagement.
Ultimately, this research contributes a valuable model for integrating cultural heritage into contemporary infrastructure planning. It highlights the need for coordinated, cross-sectoral strategies to ensure that urban development and heritage conservation advance together toward a more sustainable and culturally vibrant city.

Doktorski študijski program Znanosti o okolju

- **Neža Orel**
  Mentorici: *izr. prof. dr. Valentina Turk in doc. dr. Tinkara Tinta*
  Naslov teme disertacije: *The response of microbes to anthropogenically induced perturbations in the Gulf of Trieste (northern Adriatic Sea)*

Neža Orel je bila vpisana na doktorski študij na Fakulteti za znanosti o okolju Univerze v Novi Gorici, raziskave pa je izvajala na Morski biološki postaji Piran, Nacionalnega inštitututa za biologijo. Na isti univerzi je diplomirala (Alumnus Primus in Alumnus Optimus, 2017) in magistrirala (Alumnus Optimus, 2019) iz okoljskih znanosti. Med doktorskim študijem je pridobila široko strokovno

znanje s področja mikrobiologije in uporabe omskih tehnologij ter aktivno sodelovala pri mednarodnih znanstvenih izmenjavah, kot so obiski in predstavitve na Univerzi na Dunaju, Gordon Research Conference (Švica) in Ocean Sciences Meeting (ZDA). Objavila je šest znanstvenih člankov v vodilnih revijah s področja mikrobne ekologije, tri kot prvi avtor. Leta 2021 je prejela štipendijo FEMS za raziskovanje in izobraževanje na Univerzi na Dunaju.
Njena disertacija se osredotoča na odziv mikrobnih združb na antorpogene pritiske v obalnem ekosistemu Tržaškega zaliva, ki vključujejo vnose hranil in mikrobno onesnaženje z odpadnimi vodami in spiranjem s površin. Celoletna raziskava je razkrila izrazite sezonske spremembe v strukturi mikrobioma pegaliala, medtem ko so bili indikatorji fekalnega onesnaženja prisotni vse leto in so vključevali potencialno patogene, ki jih tradicionalni pristopi spremljanja onesnaženja spregledajo. V sklopu doktorata je sestavila celotne genome izbranih izolatov rodu Vibrio in odkrila njihove patogene lastnosti, vključno z novim plazmidom, povezanim z obrambo in horizontalnim prenosom genov. Kratkotrajni poskus z dodajanjem odpadne vode je pokazal pomembne funkcionalne spremembe v metabolnih procesih, zlasti pri razgradnji beljakovin in lipidov. Na splošno njeno delo poudarja pomen uporabe molekularnih in multiomskih orodij za spremljanje stanja v okolju ter razkriva odpornost kot ranljivost obalnih mikrobiomov pod vplivom antropogenih pritiskov.

Neža Orel was enrolled in PhD program at the School of Environmental Sciences, University of Nova Gorica, and carried out her research at the Marine Biology Station Piran, National Institute of Biology. She obtained Bachelor's (Alumnus Primus and Alumnus Optimus, 2017) and Master's (Alumnus Optimus, 2019) degrees in Environmental Sciences from the same university. During her PhD, she developed broad expertise in microbiological and meta-omics methods and has actively participated in international scientific exchanges, such as visits and presentations at the University of Vienna, Gordon Research Conference (Switzerland), and Ocean Sciences Meeting (USA). She has published six scientific papers in leading journals in the field of microbial ecology, three as first author. In 2021, she was awarded FEMS fellowship for research and training at University of Vienna.
Her dissertation focuses on the response of microbial communities to human-induced pressures in the coastal ecosystem of the Gulf of Trieste. These include nutrient

inputs and microbial contamination from wastewater and runoff. A year-round survey revealed strong seasonal patterns in the pelagic microbiome, while bacteria indicators of fecal pollution remained consistently present and included potential pathogens overlooked by traditional monitoring approaches. She assembled whole genomes of selected Vibrio isolates, uncovering pathogenic traits, including novel plasmid associated with defense and horizontal gene transfer. A short-term wastewater addition experiment showed significant functional shifts in microbial metabolism, particularly in protein and lipid degradation. Overall, her work highlights the value of molecular and multi-omics tools for environmental monitoring, revealing both the resilience and vulnerability of coastal microbiomes under anthropogenic pressures.