

Curriculum Vitae

Fabio Lapenta

Education

- **Ph.D in Biomedicine** **October 2019**
Faculty of Medicine, University of Ljubljana, Slovenia
 - **Master's Degree in molecular and industrial biotechnology** **March 2014**
University of Bologna, Italy – Final grade: 110/110 cum laude
 - **Bachelor's Degree in molecular biology** **July 2011**
University of Pisa, Italy – Final grade: 110/110 cum laude
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Research experience

- University of Nova Gorica, Slovenia** **January 2021 - Current**
Postdoctoral contract research
- Title:** **Role of APOBEC proteins in the oncogenesis of HPV viruses**
- Supervisor:** *dr. Martina Bergant Marušič, University of Nova Gorica, Slovenia*
Laboratory for Environmental and Life Sciences
- Description:** Cell biology and genetic studies employed to understand the molecular role of the cytidine deaminases APOBECs in HPV infection and oncogenesis.
- National Institute of Chemistry, Slovenia** **November 2019 – January 2021**
EN-FIST – Center of excellence, Slovenia **(half-time)** **July 2020 – January 2021**
Postdoctoral contract research
- Title:** **Production and characterization of biomolecular nanostructures**
- Supervisor:** *prof. dr. Roman Jerala, National Institute of Chemistry (KI), Ljubljana, Slovenia*
Department of Synthetic Biology and Immunology
- Description:** Design and characterization of oligomeric protein cages. Structural and biophysical characterization of large non-natural CC-based protein cages and their folding pathway.
- National Institute of Chemistry (KI), Slovenia** **June 2015 – October 2019**
Early Stage Researcher in Marie Skłodowska-Curie ITN Action
- Title:** ***In vivo* self-assembling coiled-coil-based protein origami**
- Supervisor:** *prof. dr. Roman Jerala, National Institute of Chemistry (KI), Ljubljana, Slovenia*
Department of Synthetic Biology and Immunology
- Description:** Design and characterization of coiled-coil-based *de novo* proteins. Production in *E. coli* and characterization of recombinant proteins.
- Consorzio per lo Sviluppo dei Sistemi a Grande Interfase (CSGI)** **June 2014 - April 2015**
Contract research for SO.G.I.S., Cremona, Italy - University of Bologna
- Title:** **Microbial-Assisted conversion of agro-industrial waste in Biodiesel**
- Supervisor:** *prof. Alejandro Hochkoeppler, University of Bologna, Italy,*
Department of Industrial Chemistry Toso Montanari (CSGI)
- Description:** Collaboration among private companies and University of Bologna. Oleaginous yeasts were grown in agro-industrial waste and screened for fatty acid production.

University of Bologna

April 2013 - March 2014

Master's thesis experimental work

Title: Characterization of the pyrophosphatase activity of the PHP domain of *Escherichia coli* DNA Polymerase III

Supervisor: prof. dr. Alejandro Hochkoeppler, University of Bologna, Italy
Department of Industrial Chemistry Toso Montanari

Description: A bacterial endogenous polymerase and its single-point mutants were over-expressed in *E. coli* and characterized for specific enzymatic activity.

University of Pisa

March 2011 - June 2011

Bachelor's thesis experimental work

Title: Functional screening for the effects of BRCA2's SNPs in *S. cerevisiae*

Supervisor: prof. dr. Alvaro Galli, CNR, Pisa, Italy
Institute of Clinical Physiology (IFC)

Description: Expression of human oncogene BRCA2 and phenotypic evaluation in *S. cerevisiae*.

Technique expertise

- **Molecular cloning:** Plasmid design, restriction-ligation, Gibson cloning, site-specific mutagenesis.
- **Protein production:** Expression and optimization screening for recombinant protein production in *E. coli*, purification via fractionation and chromatographic techniques (IMAC, IEX, HIC, SEC). FPLC and HPLC installation and usage, column packing and protocol development.
- **Protein quality and characterization:** Structural and biophysical protein characterization (SEC-MALS, DLS, CD, ITC, SPR, Native PAGE, Thermofluor), SAXS data collection and analysis, crystallization trials and buffer optimization, protein labelling, fluorescence and enzymatic assays (FRET, stopped-flow).
- **Computational biochemistry:** Homology modelling (MODELLER), protein structure analysis and python scripting.
- **Microbiology:** Optimization of culture media for yeasts and bacteria and evaluation of physiological effect such as survival, morphological phenotype and fatty acid production.
- **Cell biology:** Human cell line culturing, transfection, protein expression profiling and fluorescent microscopy.

Scientific publications

Experience in writing scientific article, topical review and technical report in collaborative research projects. Authored 12 articles in accredited scientific journals, 6-times as a first author or shared first authorship.

Participation in projects supported by the Slovenian Research Agency

- **N4-0037.** In vivo folding of designed protein (1.9.2015 - 31.08.2018) Jerala Roman.
- **J3-7034.** Advanced nano-vaccines based on protein origami combining activators of innate and adaptive immune response (1.1.2016 - 31.12.2018) Benčina Mojca
- **P4-0176.** Molecular Biotechnology: from the Dynamics of Biological Systems to Applications (1.1.2015 - 31.12.2021) Jerala Roman.
- **J1-2481.** Mathematical and computational methods for polyhedral self-assembly (1.9.2020 - 31.8.2023) Bašić Nino.
- **J1-1711.** Designed protein origami based receptors: functionalized designed protein nanostructures for the recognition of the selected targets (1.7.2019 - 30.6.2022) Gradišar Helena.
- **J3-9268.** Cancer immunotherapy modulation by ultrasound (1.7.2018 - 30.6.2021) Benčina Mojca.

- **J3-9257**. Molecular mechanism of endogenous TLR4 agonist formation and its role in chronic inflammatory diseases (1.7.2018 - 30.6.2021) Manček Keber Mateja.
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Participation in European projects

- **TOLLerant** - Marie Skłodowska Curie ITN (MSC-ETN 642157 Tollerant) funded by Horizon 2020: Toll-Like Receptor 4 activation and function in diseases: an integrated chemical-biology approach.
 - **MediSURF** - ERA-NET initiative (Reference Number: project3193): Designed nanostructured bioactive surfaces for precision medicines.
 - **MaCChines** - ERC Advanced Grant 2017 (Grant agreement ID: 787115): Molecular machines based on coiled-coil protein origami.
 - **BioRoboost** - H2020-NMBP-BIO-CSA-2018 (Grant agreement ID: 820699): Fostering Synthetic Biology standardisation through international collaboration
 - **iNEXT** - funded under H2020-EU.1.4.1.2. (Grant agreement ID: 653706): Infrastructure for NMR, EM and X-rays for Translational research.
 - **BioOrigami** - ERA-NET initiative ERASYNBIO1-006: Establishing foundations in structural synthetic biology to engineer biomolecules for new routes to nanoscale objects and biomaterials.
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Patent contributions

- A combination of split orthogonal proteases with dimerization domains that allow for assembly. *European Patent Application EP3526325*
 - The method for improvement of responsiveness of cells to ultrasound and mechanical stimuli with gas vesicles and sensitised mechanosensors. *European Patent Application EP3523317*
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Lectures at international conferences

- Hierarchical self-assembly of a coiled-coil-based bipyramidal protein cage. *Protein engineering II : from new molecules to new processes*. York, UK, Biochemical Society, July 15th – 17th, 2019
 - Self-assembly of a coiled-coil-based bipyramidal protein cage. *Bioinspired Materials, Gordon Research Conference Bioinspired Multifunctional Dynamic Materials*, Les Diablerets Conference Center, Les Diablerets, Switzerland, June 24-29, 2018.
 - Hierarchical self-assembly of a de novo heterodimeric coiled-coil-based bipyramidal protein cage. *Bioorigami - designed bionanostructures from nucleic acids to proteins and beyond*, Ljubljana, Slovenia, June 21st - 23rd, 2017.
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Mentorship experience

- Training of undergraduate and Ph.D. students in protein production and characterization.
 - Supervisor for Marco Vezzoli Master's Thesis (Erasmus from Univ. of Parma, July 2020).
 - Mentor for the Slovenian 2016 iGEM undergraduate student's team.
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Short-term research experiences

- CIC-biomaGUNE, San Sebastian, Spain, April 2018 (1 month). Radio-labelling of protein samples for *in vivo* tracking and tumor-retention.
- University of Milano-Bicocca, Milan, Italy, July 2017 (1 month). Stimulation of cell cultures with immuno-stimulatory protein conjugates.

- Lofarma s.p.a., Milan, Italy, November 2017 (1.5 month). Joined formative training for industrial-pharmacy, Good Laboratory Practice (GLP) and working pipeline.
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Awards

- Pregl Award for outstanding doctoral work – 2019 National Institute of Chemistry (personal).
 - Best Foundational Advance Project – 2016 iGEM (team award).
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Language knowledge

- Native Italian language speaker.
- Proficient in English speaking and writing.
- Basic knowledge of Slovene language.