Filip B. Bečanović

Optimization • Robotics • Biomechanics • Machine Learning

Dr Agostina Neta 66, 11070, Belgrade, Serbia

☏ (+381) 64 566 24 28 | ✉ filip.becanovic@gmail.com | filipbecanovic | beca-filip

Professional Summary

Postdoctoral researcher specializing in inverse optimal control and biomechanics with experience in robotics and machine learning applications. Completed cotutelle Ph.D. between University of Belgrade and University Paris-Est Créteil. Published record includes 2 journal articles and 8 conference proceedings. Experienced in teaching, student mentorship, and international collaboration. Currently serving as Technical Project Manager for €3M Horizon Europe CITADELS project.

Education

University Paris-Est Créteil — *Paris, France*

Cotutelle PhD in Signal Processing, Imaging, and Control Systems — *Nov, 2020 – Feb, 2024*

École Doctorale Mathématiques et Sciences de la Technologie, Information, et Communication.
Dissertation title: "Uncovering optimal control strategies in human motion through inverse optimal control".
Dissertation committee: Milica Janković, Željko Đurović, Vincent Bonnet, François Charpillet, Vincent Padois.
Advisor: Prof. Samer Mohammed.

MSc (Erasmus+ Mobility) in Signal Processing, Imaging, and Control Systems — *Jan, 2020 – Jul, 2020*

Biometrics module.
GPA: 16.5 (out of 20).

University of Belgrade, School of Electrical Engineering — *Belgrade, Serbia*

Cotutelle PhD in Electrical Engineering and Computer Science — *Nov, 2020 – Feb, 2024*

Signals and Systems department.
Dissertation title: "Uncovering optimal control strategies in human motion through inverse optimal control".
Dissertation committee: Milica Janković, Željko Đurović, Vincent Bonnet, François Charpillet, Vincent Padois.
Advisor: Prof. Kosta Jovanović.

MSc in Electrical Engineering and Computer Science — *Oct, 2019 – Sep, 2020*

Signals and Systems department.
GPA: 9.33 (out of 10).

BSc in Electrical Engineering and Computer Science — *Oct, 2015 – Sep, 2019*

Signals and Systems department.
GPA: 9.42 (out of 10).

Professional Positions

University of Belgrade, School of Electrical Engineering — *Belgrade, Serbia*

Research Associate, ETF Robotics Laboratory — *Dec, 2024 - Present*

Leading independent research on inverse optimal control and inverse reinforcement learning applications in human biomechanics; Participating in teaching 2 courses; Supervising 2 graduate students on thesis projects in biomechanics and motion analysis; Managing the MUSAE project implementation; Managing project applications; Procuring lab equipment; Technical Project Manager for €3M HEU project CITADELS.

Research Assistant, ETF Robotics Laboratory — *Apr, 2021 – Dec, 2024*

Conducted directed research on inverse optimal control applications in human biomechanics under the supervision of my PhD advisors; Participating in teaching 2 courses; Managing the MUSAE project implementation; Managing project applications; Procuring lab equipment; Securing €3M funding for HEU project CITADELS under Prof. Kosta Jovanović.

Microsoft Development Center Serbia (MDCS) — *Belgrade, Serbia*

Mathematical Data Labelling Associate, Math Team — *Feb, 2019 – Jun, 2019*

Contributed to data annotation and quality assurance for machine learning math applications; Specialized in annotating branching solutions to complex numbered equations; Collaborated with senior software engineers on mathematical content validation; Developed expertise in labelling standards for AI training datasets.

University of Belgrade, School of Electrical Engineering *Belgrade, Serbia*
Lab Assistant, Electrical Engineering Laboratory *Feb 2019 – May 2019*
Led lab sessions for the largest hands-on 1st year course.

Horizon Europe Projects
Technical Project Manager, Work Package Leader *Sep, 2025 – Present*
CITADELS: Cultivating Industry 5.0 Talents: Academia-industry collaboration and empowerment through accessible DEep technoLogieS (~€3M); Call: HORIZON-WIDERA-2024-TALENTS-03; Grant ID: *101217281; Representing: University of Belgrade – School of Electrical Engineering (~€500K)*
Leading technical project management and coordination across 10-partner consortium from 8 countries; Authored Project Management Plan (D1.1) establishing governance, communication protocols, and KPI monitoring frameworks; Organized project Kick-Off including agenda development and team-building activities; Coordinating WP4 research talent secondments involving 20 researchers; Led proposal development contributing to objectives, KPIs, work distribution, and consortium synergy analysis; Serving as primary institutional liaison coordinating all work packages.

Researcher, Management, Technical Staff *Sep, 2023 – Aug, 2025*
MUSAE: A Human - Centered Factory for a Future Technological Sustainable Development Driven by Arts (~€3M); Call: HORIZON-CL4-2021-HUMAN-01; *Grant ID: 101070421; Representing: University of Belgrade – School of Electrical Engineering (~€400K)*
Implemented HEU art-tech collaboration project with multidisciplinary 9-partner consortium from 6 countries; Mentored 1 artist (First Residency) and 1 artist-SME team (Second Residency), supported 5 additional teams; Facilitated DFA methodology workshops and training; Collected and curated EEG+motion datasets on cooking activities (CC BY4.0, Zenodo); Co-organized MUSAE Final Exhibition (~180 visitors) and led STARTS Academy (~40 participants); Authored multiple deliverables (D2.10-D2.11; D8.1-D8.3), reporting on DFA methodology training and mentoring, art-tech experiments, and resulting technological prototypes.

Publications

Journal Papers (published)
1. **Bečanović, F.**, Bonnet, V., Dumas, R., Jovanović, K. and Mohammed, S., 2022. Force Sharing Problem During Gait Using Inverse Optimal Control. *IEEE Robotics and Automation Letters*, 8 (2), pp. 872-879. [DOI: 10.1109/LRA.2022.3217398].

Journal Papers (accepted)
2. **Bečanović, F.**, Bonnet, V., Jovanović, K. and Mohammed, S., Dumas, R., 2025. Inverse Optimal Control of Muscle Force Sharing During Pathological Gait. *Journal of Biomechanics, Elsevier. [Accepted in Elsevier's Journal of Biomechanics; Preprint on arXiv: https://arxiv.org/abs/2510.17456]*

Conference Proceedings (published)
1. Sabbah, M., **Bečanović, F.**, Mehrdad, S., Righetti, L., Watier, B., Bonnet, V., 2025. Minimal Observations Inverse Reinforcement Learning for Predicting Human Box-Lifting Motions. 2025 IEEE-RAS 24th International Conference on Humanoid Robots (Humanoids). [Preprint available on HAL: hal-05191852.]
2. Mesaroš, D., Sabbah, M., Bonnet, V., **Bečanović, F.**, 2025. Optimal Control for Human Vertical Jump Motion. Advances in Service and Industrial Robotics, RAAD 2025, Mechanisms and Machine Science, vol 190. Springer, Cham. [DOI: 10.1007/978-3-032-02106-9_26]
3. **Bečanović, F.**, Bonnet, V. and Jovanović, 2024. Reliability of Single-Level Equality-Constrained Inverse Optimal Control. 2024 IEEE-RAS 23rd International Conference on Humanoid Robots (Humanoids), pp.623-630. [DOI: 10.1109/Humanoids58906.2024.10769923]
4. Klasanović, D., Jugović, L., Ružić, N., **Bečanović, F.** and Knežević, N., 2024. Application and Optimal Design of a Soft Robotic Gripper for Grasping Objects of Arbitrary Shape. *11th International Conference on Electrical, Electronic and Computing Engineering (IcETRAN 2024)*, pp. 77. [DOI: 10.1109/IcETRAN62308.2024.10645079]
5. Lukić, B., **Bečanović, F.**, and Radmilović, M., 2024. Human motion estimation application for the marker-based motion capture systems. *11th International Conference on Electrical, Electronic and Computing Engineering (IcETRAN 2024)*, pp. 80. [DOI: 10.1109/IcETRAN62308.2024.10645143]
6. Rodić, F., **Bečanović, F.**, Aleksić, J., Mirkov, D. and Jovanović, K., 2024. Synchronization of Motion Capture and Forceplate Data for Analysis of Vertical Jumping. *11th International Conference on Electrical, Electronic and Computing Engineering (IcETRAN 2024)*, pp. 80. [DOI: 10.1109/IcETRAN62308.2024.10645109]
7. **Bečanović, F.**, Miller, J., Bonnet, V., Jovanović, K. and Mohammed, S., 2022. Assessing the Quality of a Set of Basis Functions for Inverse Optimal Control via Projection onto Global Minimizers. *IEEE 61st Conference on Decision and Control (CDC),* pp. 7598-7605. [DOI: 10.1109/CDC51059.2022.9993342]
8. Radmilović, M., Urukalo, Đ., Petrović, M., **Bečanović, F.** and Jovanović, K., 2021. Influence of muscle co-contraction indicators for different task conditions. *8th International Conference on Electrical, Electronic and Computing Engineering (IcETRAN 2021)*, pp. 584-590. [ISBN 978-86-7466-894-8]

9. **Bečanović, F.,** Bonnet, V., Mohammed, S. and Jovanović, K., 2021. Pronalazak Optimizacione Funkcije Kretanja iz Simulirane Demonstracije Pokreta Čučnja. *65th Conference on Electrical, Electronic and Computing Engineering (ETRAN 2021)*, pp. 551-555. [ISBN 978-86-7466-894-8]

Teaching

University of Belgrade, School of Electrical Engineering *Belgrade, Serbia*

Teaching Assistant – 13E054BMH Biomechanics (Undergraduate Level) *2023 - Present*

Developed curriculum from ground up based on Stanford course; Delivered lectures (~24 hours) for ~10 students/year covering musculoskeletal modeling, motion capture analysis, and biomechanical simulation techniques; Developed hands-on exercises integrating motion capture data with computational models; Held regular office hours providing individual student support on course projects; Graded all assignments and exams.

Teaching Assistant – 13M051RS Robotic Systems (Graduate Level) *2023 - Present*

Delivered lectures (~6 hours) covering human motion analysis and prediction through optimal control, trajectory planning, and inverse kinematics for ~20 students/year; Mentored student teams (~3/year in pairs) on semester-long robotics projects.

Lab Assistant - 13E071LOE Lab in Electrical Engineering (Undergraduate level) *2023 - Present*

Led lab sessions (~64 hours) on electrical circuit analysis and measurement techniques to approximately 8 students per 2-hour session (with frequent changes in group composition); Graded homework and assignments.

University Paris-Est Créteil *Paris, France*

Teaching Assistant – Synthèse SPI (Undergraduate Level) *2021*

Led lab sessions (~42 hours) on robotic systems and control theory for ~40 students; Stepped in to deliver sessions on control systems and motor modeling when needed; Supervised and assisted students in their project on simulating mobile robots using Python and V-REP; Contributed to grading.

Institutional Service

Thesis Supervision

Filip Rodić. 2025. Biomechanics of the high jump - from experimental analysis to optimal control. MSc Thesis. University of Belgrade – School of Electrical Engineering. [Byproduct: Published conference paper at IcETRAN 2024.]

David Mesaroš. 2024. Development and implementation of a 3D 18DoF body model for high jump analysis using MediaPipe pose estimation. BSc Thesis. University of Belgrade – School of Electrical Engineering. [Byproduct: Published conference paper at RAAD 2025.]

Student Mentoring & Development

Mentoring Anastasija Rakić for the 2026 cotutelle PhD scolarship by Campus France.

Mentored Valerijan Matvejev for the 2025 cotutelle PhD scholarship by Campus France (successful).

Mentored David Mesaroš for the MEXT 2024 scholarship application for studies in Japan (successful). David is now a research student at the CNRS-AIST Joint Robotics Lab in Tsukuba, Japan.

Committee Involvement

Committee for the Assessment of Doctoral Dissertation Proposal

(Member) Jelena Aleksić. 2025. Feasibility of AI-Based Markerless Motion Capture for Assessing Movement Quality. University of Belgrade - Faculty of Sport and Physical Education.

Honors, Awards, and Fellowships

Excellence Research Stays in France *Bordeaux, France*

by French Institute in Serbia (*It Makes S(ci)ense*), 1-month Fellowship *Nov, 2024*

Competitive fellowship for research visit; criteria: scientific excellence, host invitation. Visit to INRIA Bordeaux for upskilling in optimal robot control.

French Government Cotutelle PhD Scholarship *Paris, France*

by Campus France, 18-month Scholarship *Nov, 2020 – Nov, 2023*

Competitive national award for cotutelle doctoral programs; criteria: academic excellence, research proposal strength, language proficiency. Fully funded cotutelle (6-months/year) doctoral research at University Paris-Est Créteil.

Erasmus+ Outgoing Mobility Award — *Paris, France*
by EU Erasmus+ Program, 6-month Graduate Study Award — *Jan, 2020 – Jul, 2020*

Competitive scholarship prioritizing top academic performers; criteria: grades, motivation, language. Funded Master's level study in biometrics and signal processing. Achieved GPA of 16.5/20.0 during mobility period

National Excellence Scholarship — *Paris, France*
by Ministry of Science, Technological Development and Innovation (Serbia) — *Oct, 2017 – Sep, 2020*

Merit-based scholarship; criteria: minimum GPA 9.0, all exams passed. Maintained GPA of 9.42 (undergraduate) and 9.33 (graduate).

Travel Grants
Eastern European Machine Learning Summer School (EEML2024) — *Jul, 2024*

Full 7-day accommodation and travel grant (selected from 700+ applicants). Sponsored by Google DeepMind.

10th Practical Seminar in Machine Learning (PSIML10) — *Jul, 2024*

Full 10-day accommodation and travel grant (selected from 200+ applicants). Sponsored by Microsoft Serbia.

International Experience

Inria Center, University of Bodeaux (Inria Bordeaux) — *Bordeaux, France*
Visiting Researcher, Collaborative Robotics, Auctus Team — *Nov, 2024*

Completed to a week-long model predictive control tutorial led by postdoc Sebastien Kleff; Organized alternating reading groups and presentations with postdoc Jacques Zhong on quality diversity optimization and inverse optimal control; Held lab-wide presentation of my poster on single-level inverse optimal control.

Laboratory for Analysis and Architecture of Systems (LAAS-CNRS) — *Toulouse, France*
Visiting Researcher, Humanoid Robotics, Gepetto Team — *Jan, 2023 – May, 2023*

Visiting Researcher, Humanoid Robotics, Gepetto Team — *Jan, 2022 – May, 2022*

Conducted 12-month onsite collaborative research on human motion optimization; Worked directly with Prof. Vincent Bonnet on inverse optimal control applications; Developed computational frameworks for analyzing pathological gait patterns; Developed independent collaboration with Jared Miller, Chateaubriand fellow; Developed theoretical and computational tools for lower-bounding error in inverse optimal control; Participated in biweekly group seminars and presented research findings; Established ongoing collaboration resulting in multiple joint publications.

Laboratory for Images, Signals, and Intelligent Systems (LISSI) — *Paris, France*
Cotutelle PhD Researcher, Human Motion & Wearable Robotics, Sirius Team — *Jan, 2021 –May, 2021*

Worked with Prof. Vincent Bonnet on surveying human motion optimization literature, later used in my PhD dissertation; Worked directly with Prof. Samer Mohammed and postdoc Randa Mallat to design an experimental protocol for human box-lifting data collection and annotation using motion capture and force plates, which was used in my PhD dissertation and later publications;

Student Researcher, Human Motion & Wearable Robotics, Sirius Team — *Jan, 2020 –Apr, 2020*

Worked directly with Prof. Vincent Bonnet on simulating human squatting motion and performed computational experiments with inverse optimal control; Resulted in a publication at the ETRAN conference in 2021.

Professional Activities & Service

Conference organization
Local Arrangement Chair, RAAD2025 Conference in Belgrade, Serbia — *Jun, 2025*

Coordinated keynote, plenary, and honorary speaker (~10 speakers) travel & lodging, vendor contracting, and program materials (abstracts & intros) from booking to stage introduction, for a conference with ~150 registered participants.

Peer-review
Reviewed a total of 15+ papers for the following venues: IEEE Robotics and Automation Letters (RA-L); IEEE International Conference on Robotics & Automation (ICRA); IEEE-RAS International Conference on Humanoid Robots (Humanoids); IEEE Control and Decision Conference (CDC); International Conference on Robotics in Alpe-Adria-Danube Region (RAAD); International Conference on Electrical, Electronic and Computing Engineering (IcETRAN).

Memberships
IEEE — *2021-2025*

IEEE Robotics and Automation Society — *2023-2025*

Professional Development

Summer Schools

Eastern European Machine Learning Summer School (EEML2024) *Jul, 2024*

Intensive 5.5-day seminar with ~35 hours of lectures and ~8 hours of coding sessions by esteemed speakers from the global machine learning community. Topics included multimodal AI, (vision-language models), geometric deep learning (graph neural networks), large language models, and generative AI.

10th Practical Seminar in Machine Learning (PSIML10) *Jul, 2024*

Intensive 10-day seminar with ~30 hours of lectures and ~10 hours of coding sessions by industry and academic experts from Serbia. Topics included machine learning software and hardware, computer vision, natural language processing, generative AI, and reinforcement learning. Worked in a team of 3 to complete a ~40-hour project on 3D scene reconstruction from video, where we augmented the sample efficiency of Neural Radiance Fields by using depth-from-video models.

MOOCs

KalMOOC *Dec, 2024*

Completed a 50 hours theoretical and practical training on the Kalman filter.

Modern Robotics (Coursera) *Apr, 2021 – Jul, 2021*

Completed an 8-week theoretical and practical training on the modern approach to robotics.

Neural Networks and Deep Learning (Coursera) *Mar, 2021*

Completed a 4-week theoretical and practical training on Neural Networks and Deep Learning.

Languages

Serbian Native

French Native

Eight years of French public-school education (2000–2004, 2009–2013).
Diplôme National du Brevet, Mention Assez-Bien, July 2012.
Centre International d'Études Pédagogiques - "DELF (B2)", Grade 91.50/100, December 2014.

English Proficiency

Cambridge University Press & Assessment - "Certificate of Proficiency in English (C2)", Grade 221/230, January 2025.

Spanish Beginner

Four years of Spanish in school (2009-2013). Self-assessed.