

MSCA Postdoctoral Fellowship at Eurac Research Call 2025

List of topics and research fields

Researchers willing to submit a proposal for the MSCA Postdoctoral Fellowship with Eurac Research are welcome to propose their own project idea. Some of our institutes/centers and researchers willing to serve as supervisors have, however, also indicated topics and research fields that they are particularly interested in working with. If wishing to work on one of these topics/research fields, we ask to indicate the corresponding topic number in the expression of interest.¹

Topic 1	
Name of the supervisor	Francesca Di Leva
Institute	Institute for Biomedicine
Research field	Neuroscience
Brief description	Our group is investigating the role of ITPKB dysregulation in Parkinson Disease and Multiple System Atrophy, two forms of synucleinopathies. In this project we will analyse the expression profile in relevant pathological human brain regions and cell types affected through disease progression. In parallel, we will test the ability of this kinase to modulate calcium release from cellular storages and mitochondrial respiration in several cellular models that we have generated. These cells were engineered to express higher levels of ITPKB. We are also moving to 2D cellular cultures to generate cortical neurons in which characterize ITPKB functions. Finally, we will evaluate the potential of modulating ITPKB function as a potential therapeutic strategy for disease modification.

¹ More information under <https://www.eurac.edu/en/research-support/marie-sklodowska-curie-week>

Topic 2	
Name of the supervisor	Fabiola Del Greco M.
Institute	Institute for Biomedicine
Research field	Biostatistics/Epidemiology/Computational statistics
Brief description	<p>Improving public health is the ultimate goal of biomedical research. Causal inference - how specific biomarkers, treatments, and other exposures could affect disease outcomes - dominates the great majority of clinical and public health research investigations, for its key role in the making decisions process.</p> <p>Non-randomised observational data from the Cooperative Health Research in South Tyrol (CHRIS) study, along with its wealth of phenotypic, molecular (e.g. metabolomics, proteomics), and genetic data (e.g. genotypes, whole-exome sequencing), represents an unique resource for investigating causalities. It offers the potential to tackle the most recent challenges of making causal inferences in healthcare applications, such as processing high-dimensional and complex structured data, by incorporating more advanced analytical methods like machine learning.</p>

Topic 3	
Name of the supervisor	Cristian Pattaro
Institute	Institute for Biomedicine
Research field	Genetic Epidemiology / Statistical Genetics / Bioinformatics
Brief description	<p>Interest lies in statistical and computational methods that may help identify the molecular determinants of complex traits. The main applications concern kidney function, cardiovascular health, and the immune system. Methodological problems of interest arise from, but are not limited to, the areas of: large-scale, multi-ancestry, genome-wide association study meta-analyses; whole-genome and whole-exome sequencing studies; multiomics data integration; modelling of non-conventional phenotypes, including censored and mixture traits; causal inference leveraging genetic data.</p>

Topic 4	
Name of the supervisor	Mattia Volta
Institute	Institute for Biomedicine
Research field	Molecular neurodegeneration
Brief description	<p>We investigate the molecular and cellular mechanisms underlying onset and progression of Parkinson's disease (PD). Specifically, we validate novel targets involved in genetics and genomics of PD from a biological point of view and provide preclinical evidence for therapeutic utility. In the last few years, we built expertise and focus on the autophagy-lysosome pathway as cellular process involved in</p>

	<p>PD etiology, its regulation and dysfunction, and the link to neuronal activity and early synaptic alterations.</p> <p>To do this, we are also developing human models such as neurons and cerebral organoids generated from induced pluripotent stem cells (iPSCs). Combining 2D and 3D models with biochemical, cellular, imaging and electrophysiology techniques we study the pathophysiology of the brain and test disease-modifying strategies.</p>
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Topic 5	
Name of the supervisor	Roberto Melotti
Institute	Institute for Biomedicine
Research field	Clinical & Genetic Epidemiology, Statistical learning
Brief description	<p>The population-based Cooperative Health Research in South Tyrol (CHRIS) study maintains a wealth of data spanning the phenome and genome of more than 13K adult participants in a wide rural community. Within CHRIS, I have an interest to explore and test hypotheses on the functional relationship between instrumental assessments (e.g. tremor, olfaction, pain) and self-reported health (e.g. mental health, movement disorders, cognition, sleep, pain, neurodegeneration), with a stance on health inequalities, study representativeness and clinically relevant results. The scope is to identify latent signatures and early biomarkers, which may include genetic susceptibility, to predict or causally relate these topics, through statistical learning applications (e.g. Machine learning, Structural Equation Modelling, functional data analysis).</p>

Topic 6	
Name of the supervisor	Martin Lang
Institute	Institute for Biomedicine
Research field	Biomedical Sciences
Brief description	<p>Parkinson's Disease (PD) is a rapidly increasing neurodegenerative disorder. Our research focuses on the investigation of underlying pathological mechanisms of PD, with a particular focus on mitochondrial and lysosomal defects, for disease prevention and potential therapeutic management. This translational research aims to identify and validate multiple approaches to improve PD-related phenotypes, including small molecules, as well as peptide- and oligonucleotide-based approaches. The project leverages a state-of-the-art imaging platform to drive discovery and utilizes advanced cellular models, including iPSC-derived neurons and organoids, to validate molecular phenotypes. The goal is to develop early diagnostic and treatment options, making a significant impact in the fight against PD.</p>

Topic 7	
Name of the supervisor	Corti Corrado
Institute	Institute for Biomedicine
Research field	Neuroscience
Brief description	Pathological variants spanning the coding region of the <i>SZT2</i> gene have been associated with severe autosomal recessive <u>D</u> evelopmental and <u>E</u> pileptic <u>E</u> ncephalopathies (DEE-18). The project will use patient-derived cells in which pathological mutations in <i>SZT2</i> gene are embedded in their genetic background. This model will be used to understand which cellular functions and molecular mechanisms are disrupted during neuronal development by the presence of compound heterozygous mutations in <i>SZT2</i> thus enhancing the understanding of mechanisms that lead to epilepsy. Results from this study may also be beneficial for a broader cohort of patients carrying mutations in <i>SZT2</i> and for drug resistant epilepsy.

Topic 8	
Names of the supervisors	Matteo Giacomo Prina, Steffi Misconel
Institute	Institute for Renewable Energy
Research field	Energy engineering
Brief description	EURAC is working on the integration of artificial intelligence (AI) in energy system modeling to accelerate the clean energy transition. Our work leverages AI for creating surrogate models of bottom-up energy system models that significantly reduce computational time in complex optimization problems while maintaining accuracy and allow for the study of uncertainty. We're developing techniques for renewable energy forecasting and price prediction using machine learning approaches. Additionally, our team is working on the application of large language models to support local and regional authorities with evidence-based policy recommendations for heating, cooling, and renewable energy integration. We seek collaborators to join our interdisciplinary efforts combining energy expertise with AI innovation to create robust, efficient solutions that address real-world energy challenges in diverse geographical and socioeconomic contexts.

Topic 9	
Name of the supervisor	Erwin M. Schau
Institute	Institute for Renewable Energy
Research field	Environmental Science and Engineering (Sustainable Transportation and Life Cycle Assessment (LCA)). But also Public Health, Urban Planning and Policy Studies as interdisciplinary topic.

Brief description	<p>The proposed research aims to expand the understanding of the environmental impacts associated with the transition from fossil fuel-based transportation to climate-neutrality. Building on the life cycle assessment (LCA) method, this research will explore the broader implications of the avoid – shift – improve strategy such as use of home offices, active mobility and public transport, and electrification.</p> <p>The research will not only focus on reducing CO2 emissions but will also consider other significant factors affecting human health and the environment, including particulate matter and noise pollution. The research will develop a novel LCA approach, building on the EU Environmental Footprint, but further improve it by including the avoid strategy and noise impacts, which are currently underdeveloped in existing LCA methods.</p>
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Topic 10	
Names of the supervisors	Marco Cozzini – Andrea Menapace
Institute	Institute for Renewable Energy
Research field	District heating and cooling networks
Brief description	<p>The research focuses on advancing the energy transition by increasing renewable integration, enhancing efficiency, and improving sustainability through district heating and cooling networks. These systems enable the exploitation of efficient energy sources not available at the individual building level, favouring sector coupling and promoting the required flexibility for the management of intermittent energy sources. Innovative frameworks are required to address the challenges of designing and managing complex energy networks and to harness the opportunities arising from the increasing flexibility needs of the energy market. Advanced methodologies, including high-fidelity energy modelling, computationally efficient optimisation techniques, and AI models for demand, renewable energy, and price prediction, enable robust solution definition under uncertainty, ensuring resilient and adaptive energy system operations.</p>

Topic 11	
Name of the supervisor	Andrea Carlà
Institute	Institute for Minority Rights
Research field	Political sciences
Brief description	<p>The research topic lies at the intersection of ethnic politics, migrant integration, and security studies. Minority issues have long been interlinked with security considerations. A proper understanding of this link is required in order to govern increasingly diverse societies. In this light, it is necessary to analyse processes of securitization of (old/national/ethnic/religious) minorities and/or migration (e.g.</p>

	why, how, when, they occur and so on) and how to counter such type of processes (through e.g. desecuritization, emancipation, resilience ...). Alternatively, scholars should examine various other ways security concerns intersect with minority issues and/or migration issues and the fostering of integrated societies.
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Topic 12	
Names of the supervisors	Katharina Crepaz, Josef Prackwieser
Center	Center for Autonomy Experience
Research field	Political science, history, law, philosophy, sociology, anthropology
Brief description	The Second Statute of Autonomy created a new legal framework within which it was possible to establish, at least in some areas an autonomous social system, in the fields of health care, social services and welfare and social housing. The opportunity to build private housing with the generous support of the province led to a high rate of home ownership among South Tyroleans, and laid the foundation for wealth creation in a region that was still very poor and threatened by emigration. As the recent discussion about “brain drain” shows, housing and social policies still play a core role in securing the future of the region’s economy and, ultimately, also of its minority population. Social policy can therefore also be regarded as proactive minority protection and a measure to ensure economic stability for the future. We welcome project ideas on South Tyrol’s social autonomy, focusing on political developments, or specific policy areas, possibly also in comparison to other European minorities.

Topic 13	
Name of the supervisor	Alice Valdesalici
Institute	Institute for Comparative Federalism
Research field	Law, in particular Comparative Constitutional Law, EU Law
Brief description	Our research focuses on the allocation of powers and responsibilities among and within the different levels of government of federal systems, also including intergovernmental relations, within and beyond formal institutions. Different policy areas are explored from ‘a governance perspective’. Fiscal federalism and environmental issues such as dealing with the climate change and other challenges are the major areas of investigation, but migrant integration, language policies, digitalization, education, and healthcare are also areas of expertise. These are addressed from a comparative perspective including federal systems around the globe through an extended understanding of federalism as including the level above the State, i.e., international and supranational organizations (in particular the EU and cross-border cooperation), and the level below, i.e., local government.

Topic 14	
Names of the supervisor	Roberto Mendicino
Center	Center for Sensing Solution
Research field	Sensing Technologies & Data Science
Brief description	<p>Our research focuses on edge computing utilizing microcontrollers with real-time operating systems that enable AI integration, and LTE/LPWAN connectivity. The primary objective is the development of a standalone acquisition systems characterized by low power consumption and AI trained directly on board, with the following advantages:</p> <ul style="list-style-type: none"> • Efficient algorithm power consumption and intelligent network management. • Enhanced precision and reliability of cost-effective sensors. • Mitigation of data gaps in case of sensor failures and the assignment of quality metrics to collected data. <p>Sensor nodes should be technologically advanced, economically viable, and environmentally sustainable. They can be competitive in areas such as environmental monitoring, industrial sensors, and healthcare systems.</p>

Topic 15	
Name of the supervisor	Elisabeth Alber
Institute	Institute for Comparative Federalism – Research Group Participation and Innovations
Research field	Political science, law, socio-legal studies
Brief description	<p>Our research focuses on participatory governance, democratic and institutional innovations, democratic backsliding, autonomies studies, deliberative constitutionalism and participatory Constitution-making. We investigate institutional and democratic innovations to renew and complement decision-making processes in federal democracies and decentralized (conflict-affected) contexts, in the global North and South. We also study participatory governance in border areas and in intergovernmental relations. We combine constitutional federalism, i.e. the constitutional allocation of powers, resources, and competences, with the understanding of federalism and decentralized forms of government as a resilience-enhancing governance tool that addresses societal pluralism, multilingualism, and democratic decay.</p>

Topic 16	
Name of the supervisor	Karl Kössler
Institute	Institute for Comparative Federalism
Research field	Law and political science

Brief description	<p>Our research is focused on how territories are organized in multiple levels of government (local, subnational, national, and European), thus ensuring autonomy of these levels and at the same time their integration through mechanisms of intergovernmental relations. Our work thereby looks at the autonomy and integration not only of subnational entities (like regions, cantons, etc.) but also of local governments.</p> <p>These topics remain highly relevant because ethno-cultural diversity, as well as territorial diversity (regarding the geographical location of subnational and local entities, and their respective demographic, economic, and political weight), are essential characteristics of any country. These facets of diversity are two main drivers for arrangements of multilevel government and for a trend towards increased intergovernmental cooperation.</p>
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Topic 17	
Names of the supervisors	Lionel Nicolas Jennifer-Carmen Frey
Institute	Institute for Applied Linguistics
Research field	Research infrastructures for learner corpora
Brief description	<p>Learner corpora, i.e. large collections of authentic language productions collected from learners of a second or foreign language, are important tools to understand second language acquisition processes and proficiency development and have been used not only for linguistic studies but also to inform syllabus design, language teaching and automated assessment. Over the last decades, the field has become increasingly important with many new corpora being built all over the world, representing a vast spectrum of language learning contexts. As rigorous design ensures representativeness, comparability, and reliability for linguistic and pedagogical insights, newly created research infrastructures allow a bigger community to access and compare these resources.</p>

Topic 18	
Name of the supervisor	Francisco Javier Romero Caro
Institute	Institute for Comparative Federalism
Research field	Law and political science
Brief description	<p>In the ever-evolving landscape of multilevel governance, federalism and autonomy remain central to political debates. A key challenge is balancing self-rule with national unity—an equilibrium increasingly tested by secessionist movements, as seen in Catalonia, Scotland, and Quebec. These cases raise pressing questions about how to reconcile regional aspirations with state integrity while maintaining democratic stability.</p> <p>At the same time, democratic institutions face mounting pressures from a broader global trend: the growing appeal of autocratic governance. Even in established democracies like the United States, Hungary, and India, autocratic approaches are gaining traction. What</p>

drives this shift? Why do political actors and segments of society embrace centralized, illiberal models? Examining the **resilience of institutions**—particularly judicial independence at federal and state levels—offers critical insights. By examining how institutional strength—or vulnerability—shapes the broader democratic framework, this research can contribute to understanding the mechanisms that enable or counteract democratic backsliding.