Topics for the PhD admission colloquium – july the 15th 2025

1. Prof. Paul Dragoș Aligică

Governance systems and institutional performance: analysis and applications

This doctoral research theme explores the complex relationships between governance systems and institutional performance in contemporary societies. It invites candidates to investigate how institutional design, administrative structures, and governance mechanisms shape outcomes in various institutional, organizational, and social settings. With a strong interdisciplinary foundation, the theme integrates insights from political science, public administration, economics, and organizational studies to examine issues such as institutional resilience, policy effectiveness, administrative reform, and innovation in governance models. Doctoral candidates will be guided to analyze institutional dynamics across national and sectoral contexts, develop frameworks for evaluating performance, and propose strategies for institutional development and reform. This theme is particularly relevant for those interested in contributing to the design and improvement of governance systems in response to technological, demographic, and geopolitical challenges.

Bibliography

Ostrom, E. (1990). Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press.
Ostrom, E. (2005). Understanding Institutional Diversity. Princeton University Press.
Kasper, W., & Streit, M. E. (1999). Institutional Economics: Property, Competition, Policies. Edward Elgar Publishing.
Nassim Nicholas Taleb, (2012), Antifragile: Things That Gain From Disorder, Random House.

2. Prof. Cosima Rughiniș

The social bifurcation of reality: social construction of diverging worldviews (first theme)

This theme investigates how polarized worldviews form and solidify, especially in relation to public controversies like climate change, vaccination, and artificial intelligence. It examines how divergent perceptions of reality are maintained through media, trust/distrust in institutions, and collective discourse.

Key topics:

Construction of competing realities (science-trusting vs. science-distrusting)
Role of media, social networks, and ideologies
Impact on cohesion, policy, and action

Recommended references:

Rughiniș, Cosima & Flaherty, M.G. (2022). *The social bifurcation of reality: Symmetrical construction of knowledge in science-trusting and science-distrusting discourses. Frontiers in Sociology*, 7:782851.
Rughiniș, Cosima et al. (2022). *Shades of doubt: Measuring and classifying vaccination confidence in Europe. Vaccine*, 40(46), 6670–6679.
Bran, Emanuela, Rughiniș, Cosima et al. (2023). *The emerging social status of generative AI: vocabularies of AI competence in public discourse.* In *2023 24th International Conference on Control Systems and Computer Science (CSCS)*, IEEE, pp. 391–398.
Atkinson, Sam (Ed.). *The Sociology Book. Big Ideas Simply Explained*, DK, 2015.
Babbie, Earl. *The Practice of Social Research*, Wadsworth, 2013.

Digital technologies, artificial intelligence, and the social construction of reality (second theme)

This theme focuses on how AI and digital tools affect perceptions of reality, reshape communication and norms, and influence agency and social structures. It addresses how AI integrates into social life (e.g., education, employment) and transforms identity, power, and community.

Key topics:
AI in daily social interactions
Mediation of social experience by digital platforms
Shifts in identity and authority due to machine learning

Recommended references:
Rughiniș, Cosima & Flaherty, M.G. (2022). *The social bifurcation of reality: Symmetrical construction of knowledge in science-trusting and science-distrusting discourses. Frontiers in Sociology*, 7:782851.
Rughiniș, Cosima et al. (2022). *Shades of doubt: Measuring and classifying vaccination confidence in Europe. Vaccine*, 40(46), 6670–6679.
Bran, Emanuela, Rughiniș, Cosima et al. (2023). *The emerging social status of generative AI: vocabularies of AI competence in public discourse.* In *2023 24th International Conference on Control Systems and Computer Science (CSCS)*, IEEE, pp. 391–398.
Atkinson, Sam (Ed.). *The Sociology Book. Big Ideas Simply Explained*, DK, 2015.
Babbie, Earl. *The Practice of Social Research*, Wadsworth, 2013.

3. Prof. Radu Carp

Cultural diplomacy at the junction between different sciences and approaches. Great powers and local actors' behaviors in a multipolar world (first theme)

The research on cultural diplomacy rapidly progressed with time, incorporating new thematic areas for exploration, as well as covering wider cultural and political geographies. The analysis of the research already done related to cultural diplomacy shows that it corresponds to the development of new cultural practices, the advancements of technologies, and to social, cultural, and political transformations taking place in local and global contexts. Further research is needed, because trajectories for the development of cultural diplomacy could be examined by interdisciplinary approaches that may focus on diplomatic channels, skills, structures, actors, meanings, and implications.

Bibliography
Bennett, O. 2020. Cultural Diplomacy and International Cultural Relations. London: Routledge.
Carta, C., and R. Higgott. 2019. Cultural Diplomacy in Europe: Between the Domestic and the International. Cham: Palgrave Macmillan.
Bopoth, L. 2023. Cultural Diplomacy. A Historical Perspective. New York: Research PR.

The european governance in a global context (second theme)
The governance models had proven its viability in the last decades at the national and at the European level and they are applied at the international level in many areas, as agriculture or environment protection. Nevertheless, they are less studied. To discuss this subject, it is necessary to have knowledge from many areas, as for example public policies, combined with sectorial approaches from social sciences or from technical sciences.

Bibliography
John BAYLIS, Steve SMITH, and Patricia OWENS (eds.), The Globalization of World Politics. Oxford University Press, 2020;

Lisa DELLMUTH, Jan Aart SCHOLTE, Jonas TALLBERG, Soetkin VERHAEGEN: Citizens, Elites, and the Legitimacy of Global Governance. Oxford University Press, 2022;
Edward KOLODZIEJ, Global Governance. Evaluating the Liberal Democratic, Chinese and Russian Solutions, Taylor & Francis, 2021;
Alex KRASODOMDSKI et al., Artificial Intelligence and the Challenge of Global Governance, www.chathamhouse.org;
Thomas WEISS, Rorden WILKINSON (eds.), International Organizations and Global Governance, Taylor & Francis, 2023.

4. Prof. Mihai Dima

Climate change impacts on the socio-economic system

As the human society is embedded in the climatic system, there are significant influences from the later to the former. As the climate change develops, one expects an intensified impact on the socio-economic system. Potential influences of natural factors on economies will be investigated by analyzing climatic indices and Gross Domestic Products (GDP) time series. GDP represents and integral indicator of economic activity and is available for countries worldwide. The focus will not be on correlations between the two types of time series, but on causal links between them. The goal is to identify causal channels through which the climate variations affect the economy.

Bibliography

Auffhammer, M. Quantifying economic damages from climate change. J. Econ. Perspect. 32, 33–52 (2018).
Burke, M., Hsiang, S. & Miguel, E. Global non-linear effect of temperature on economic production. Nature 527, 235–239 (2015).
Carleton, T. A. & Hsiang, S. M. Social and economic impacts of climate. Science 353, aad9837 (2016).
Dell, M., Jones, B. F. & Olken, B. A. Temperature shocks and economic growth: evidence from the last half century. Am. Econ. J. Macroecon. 4, 66–95 (2012).
Hsiang, S. M., Burke, M. & Miguel, E. Quantifying the influence of climate on human conflict. Science 341, 1235367 (2013).
Fernández-Villaverde, J., Guerrón-Quintana, P., Rubio-Ramírez, J. F. & Uribe, M. Risk matters: the real effects of volatility shocks. Am. Econ. Rev. 101, 2530–2561 (2011).
Kalkuhl, M. & Wenz, L. The impact of climate conditions on economic production. Evidence from a global panel of regions. J. Environ. Econ. Manage. 103, 102360 (2020).
Kotz, M., Wenz, L., Stechemesser, A. et al. Day-to-day temperature variability reduces economic growth. Nat. Clim. Chang. 11, 319–325 (2021).
Ueckerdt, F. et al. The economically optimal warming limit of the planet. Earth Syst. Dyn. 10, 741 (2019).

5. Prof. Paul Irofti

Sensor fusion for precise localization with artificial intelligence (first theme)

PhD research topic focused on precise localization based on Global Navigation Satellite Systems (GNSS), that provide critical positioning, navigation, and timing services across the globe, together with the inputs from different sensors, such as inertial measurement units (IMU). To achieve this one can perform sensor fusion between these different readings to codify constraints (mediated by high frequency IMU measurements) between successive GNSS measurements. For this task recent works have shown that Factor graph optimization (FGO) is a powerful tool, a type of graphical model used in statistics and machine learning, that can also be used to improve the accuracy of GNSS
The thesis objective will be to investigate innovative navigation algorithms exploiting factor graph optimization, both for a standalone GNSS unit and in combination with other sensors (IMU), and for

different receiver grades (including high- and low-quality modules) with a focus on the Galileo system provided by the European Space Agency.

Bibliography

[1] Kschischang, F. R., Frey, B. J., & Loeliger, H. A., Factor graphs and the sum-product algorithm. IEEE Transactions on information theory, 47(2), 498-519., 2002
[2] Dellaert, F., & Kaess, M., Factor graphs for robot perception. Foundations and Trends® in Robotics, 6(1-2), 1-139, 2017
[3] P. J. G. Teunissen and O. Montenbruck, Eds., Springer Handbook of Global Navigation Satellite Systems. Cham: Springer International Publishing, 2017
[4] Groves, P. D., Principles of GNSS. Inertial, and Multisensor Integrated Navigation Systems, 521., 2008

Data driven fault detection and isolation in water distribution networks (second theme)

PhD research topic focused on fault detection and isolation in water distribution networks. In the water network problem, the anomalies consist of pipe leaks in water distribution networks (WDN) and the goal is to detect when an anomaly takes place and to identify where in the network it happened.
There are multiple tasks that have a direct effect on leak localization performance such as: sensor placement (sensor are expensive and hard to install thus data is sparse), sensor fusion (combining multiple readings such as pressure and demand), interpolation (estimating the behaviour in non-sensorized network nodes), and finally localization based on the above through AI-based anomaly detection techniques.

Bibliography

[1] P. Irofti, L. Romero-Ben, F. Stoican, and V. Puig, “Learning Dictionaries from Physical-Based Interpolation for Water Network Leak Localization,” IEEE Transactions on Control Systems Technology, pp. 1--12, 2023.
[2] L. Romero-Ben, P. Irofti, F. Stoican, and V. Puig, “Dual Unscented Kalman Filter Architecture for Sensor Fusion in Water Networks Leak Localization,” pp. 1--12, 2024.
[3] Charu C. Aggarwal Outlier Analysis, Springer, 2017

Long-term analysis of satellite data for surface water anomalies in Romania (third theme)

PhD research topic focused on the long-term analysis of surface water anomalies in Romania using satellite data from the Landsat and Sentinel-2 missions. This research aims to monitor and evaluate changes in the spatial extent and condition of water bodies across Romania over the past four decades. Using consistent and high-resolution Earth Observation data, the project will assess the dynamics of rivers, lakes, and reservoirs, identifying periods and areas with significant deviations from historical baselines.
A central goal of the research is to understand how climate change and human activities are impacting the availability and quality of surface water in Romania. By analyzing long time series of satellite observations, the PhD candidate will investigate trends related to water shortage, seasonal fluctuations, and long-term degradation of aquatic environments. These insights will be further explored in connection with climate data, land use patterns, and hydrological stressors, to provide an integrated picture of vulnerability at both regional and national scales.

Bibliography

[1] Pekel, J. F., Cottam, A., Gorelick, N., & Belward, A. S., High-resolution mapping of global surface water and its long-term changes. Nature, 540(7633), 418-422, 2016
[2] Charu C. Aggarwal Outlier Analysis, Springer, 2017

6. Prof. Marian Zulean

Democratic governance of the military in Eastern Europe (first theme)

The main goal of this research is to evaluate the mechanisms of democratic control of the military in Eastern Europe after two decades since they were implemented.
The issue of democratic governance of the military in modern societies dates back to the classics of sociology or political science (i.e. Max Weber or Harold Lasswell). They asked: how can one control an organization who has the monopoly of violence in a democratic state and can - eventually- cast a military coup? Samuel P. Huntington and Morris Janowitz conceived -in the 1960s- proper models of democratic control of the military in democracies. Huntington model was imposed in the 1990s as a conditionality to the reforms of all East European countries willing to join NATO. About 10 East European countries were assessed - by 2004- as a functioning democracy and were admitted into NATO. However, after the admission in NATO there were no public evaluation regarding the democratic control of the military in practice.

Suggested bibliography:
Huntington, Samuel P. 1957. The Soldier and the State: The Theory and Politics of Civil-Military Relations. Cambridge: Belknap Press.
Dimond, Larry and Plattner, Marc, Civil-Military Relations and Democracy, Johns Hopkins University Press, 1996.
Kuehn, D. and A. Croissant. 2023. Routes to Reform: Civil-Military Relations and Democracy in the Third Wave. Oxford: Oxford University Press.
Marius Ghincea, Marian Zulean, "Protracted Transition: The Civilian Control over the Military and Intelligence" in Post-Communist Progress and Stagnation at 35: the case of Romania, Lavinia Stan and Diane Vancea (eds), Springer, 2024.
Zulean, Marian, 2020, "Romania: Civil-Military Relations in the Modern Age", in Oxford Research Encyclopedia, Oxford University Press.

The weaponization of information in 21st century (second theme)

The main goal of this research is to investigate what kind of institutions a resilient democracy can set up to counter propaganda, disinformation or psy-ops, avoiding dictatorship?
The role of information in a war dates back to the ancient strategists, such as Sun Tsu, but its role increased exponentially in 21st century, when hybrid wars rely on different methods of influence (propaganda, misinformation, disinformation, fake news, psy-ops) and revolutionary technology. Globalization of IT networks and development of technology- such as AI- are the diving forces that contribute to the weaponization of information. Cognitive wars are fought not only against the nations but also against multilateral alliances or institutions of regional or global governance while the fighters could be state, non-state or individuals. Despite the fact that it was an explosion of studies on hybrid wars they were mostly focused on foreign malign influence and less on internal vulnerabilities in terms of infrastructure and narratives.

Suggested bibliography:
Babbie, Earl. The Practice of Social Research, Wadsworth, 2013.
Cialdini, Robert. Influence. The Psychology of Persuasion, Harper Collins, New York, 2009.
Zubboff, Shoshana. The Age of Surveillance Capitalism, Profile Publisher, 2019.
Pamment, James. A Capability Definition and Assessment Framework for Countering Disinformation, Information Influence, and Foreign Interference, Riga: NATO Strategic Communications Centre of Excellence, available at: https://stratcomcoe.org/publications/a-capability-definition-and-assessment-framework-for-countering-disinformation-information-influence-and-foreign-interference/255.

7. **Prof. Daniel Diaconu**

Integrating ecological, urban, and social dimensions in metropolitan landscapes (first theme)

The rapid expansion of metropolitan Bucharest and its surrounding peri-urban areas has led to critical tensions between urban development, ecological integrity, and social equity. Traditionally, urban planning and forestry management in Romania have evolved along parallel, sector-specific trajectories, with limited coordination. However, in the face of accelerating climate impacts, biodiversity loss, and increasing socio-spatial fragmentation, an integrated approach is urgently needed.
This research proposes an interdisciplinary framework for the development of a Green Belt around Bucharest, integrating ecological restoration, sustainable forestry, biodiversity conservation, urban mobility, land-use planning, and community development. The aim is to create a strategic spatial planning tool that not only protects critical ecosystems and enhances connectivity but also supports social cohesion and sustainable urban growth.
The proposed framework draws on landscape ecology, metropolitan governance, and participatory planning practices to identify priority areas for intervention and to co-design multifunctional green infrastructure. The integration of remote sensing data, spatial modeling, and community-based mapping offers new insights into land-use dynamics and opportunities for ecological and social regeneration.
The Bucharest Green Belt is envisioned not only as a local intervention but as a replicable model for other Romanian urban regions facing similar pressures. Through this research, we aim to contribute to a broader understanding of green belt planning in post-socialist contexts and to support national strategies for climate adaptation and sustainable land use.

Relevant literature:
Benedict, M. A., & McMahon, E. T. (2006). *Green Infrastructure: Linking Landscapes and Communities*. Island Press.
Mell, I. C. (2016). *Green Infrastructure: Spaces and Places for Sustainable Cities*. Routledge.
Colding, J., & Barthel, S. (2013). The potential of 'Urban Green Commons' in the resilience building of cities. *Ecological Economics*, 86, 156–166. https://doi.org/10.1016/j.ecolecon.2012.10.016
Kabisch, N., et al. (2017). Nature-based solutions to climate change mitigation and adaptation in urban areas. *Springer Open*.
Forman, R. T. T. (2014). *Urban Ecology: Science of Cities*. Cambridge University Press.
Angel, S., et al. (2011). Making Room for a Planet of Cities. *Lincoln Institute of Land Policy*.

A transdisciplinary analysis of climate change data in the information age and their contribution to modern hybrid warfare (second theme)

Recent decades have, like never before, confronted humanity as is now, a hyperconnected world, with ever more complex and accelerating challenges and conflicts over natural resources, economics and global geopolitical influence.
In this context, one novel instrument gaining weight in modern unconventional warfare is weaponizing climate data from environmentally stressed areas via propaganda and the ulterior attack of strategic infrastructure hotspots in order to destabilize the respective nations at war.
This research proposes to analyze a few case studies from Europe, Russia, Africa, Middle East, Central Asia and shed more light on how ecological disinformation regarding multiplying climate threats and essential water resources in vulnerable regions (controlling or destroying dams or irrigation systems, contaminating sources, restricting access to water, taking advantage of drought and desertification) are employed in hybrid warfare schemes aimed at winning geopolitical advantages, generating ecological disasters, affecting ecosystems, and forcefully displacing populations.

The ultimate objective of this study will therefore be to investigate, by means of a transdisciplinary approach (ecology, geopolitics, sociology, communication sciences) how climate change challenges become key elements in contemporary hybrid wars and thus understand and manage them better.

Suggested Bibliography:

Brzoska, Michael & Fröhlich, Christiane. (2016). "Climate Change, Migration and Violent Conflict: Vulnerabilities, Pathways and Adaptation Strategies." Migration and Development, 5(2).
Clack, Timothy (ed.), Meral, Ziya (ed.), Selisny, Louise. (2023). Climate Change, Conflict, and (In)Security: Hot War, Routledge Advances in Defence Studies
Fridman Ofer, Kabernik Vitaly, Pearce C. James. (2019). Hybrid Conflicts and Information Warfare: New Labels, Old Politics, Rienner Publishers
Hoffman, Frank G. (2007). Conflict in the 21st Century: The Rise of Hybrid Wars. Potomac Institute for Policy Studies.
Samuels, Robert. (2023). Psychoanalysis and the Future of Global Politics: Overcoming Climate Change, Pandemics, War and Poverty, Palgrave Macmillan
Steyer, Tom. (2024). Cheaper, Faster, Better. How We'll Win the Climate War. Spiegel & Grau
UNEP (United Nations Environment Programme). (2021). Making Peace with Nature.
European External Action Service (EEAS). (2020). Disinformation and Climate: The Next Hybrid Threat.

The ecological footprint of machine learning: energy use, emissions, and mitigation strategies

(third theme)

The rapid advancement of machine learning (ML) has driven transformative changes across industries, but its environmental cost is increasingly under scrutiny. This thesis explores the ecological footprint of machine learning systems, with a particular focus on their energy, water and resources consumption and associated carbon emissions throughout the model lifecycle—from training and inference to deployment and scaling. Through a combination of analysis, energy audits, and lifecycle assessments, the research quantifies the environmental impact of various ML architectures, including deep neural networks and large language models.

In addition to impact assessment, the thesis investigates key drivers of energy usage such as model complexity, data volume, hardware choices, and geographic factors related to data center energy sources. The study further reviews and proposes mitigation strategies, including model optimization techniques (e.g., pruning, quantization), the use of carbon-aware scheduling, and deployment on low-emission infrastructures. Policy implications and industry best practices for sustainable AI development are also discussed.

By bridging technical, environmental, and ethical considerations, this research aims to inform the development of more ecologically responsible machine learning practices and support the integration of sustainability into the design and governance of AI systems.

1. The Rise of Machine Learning and Environmental Concerns
Evolution and scale of ML/AI models (GPT, BERT, AlphaFold, etc.)
Trends in computational demand (OpenAI, Google, DeepMind).
Initial concerns about the sustainability of AI research

Key sources:
Strubell et al. (2019) — Energy and Policy Considerations for Deep Learning in NLP
Schwartz et al. (2020) — Green AI
Bender et al. (2021) — On the Dangers of Stochastic Parrots

2. Quantifying the Carbon Footprint of AI
Lifecycle analysis: training vs. inference energy costs
Benchmarking CO_2 emissions (e.g., training GPT-3 = several hundred metric tons CO_2)
Geographic variation in carbon intensity (based on energy source mix)

Key sources:
Patterson et al. (2021, Google) — Carbon Emissions and Large Neural Network Training
Anthony et al. (2020) — Carbontracker: Tracking and Predicting the Energy Consumption of ML Training
Luccioni et al. (2022) — Estimating the Carbon Footprint of ML Training with CodeCarbon

3. Contributors to ML's Energy Use
Hardware (GPUs, TPUs, ASICs)
Software and training configurations (batch size, epochs)
Data center energy mix and location (renewable vs. fossil fuel-powered)

Key sources:
Google's data center efficiency reports
AI Index Report (Stanford, annual)
Henderson et al. (2020) — Towards the Systematic Reporting of the Energy and Carbon Footprints of ML

4. Mitigation Strategies and Sustainable ML
Model compression: pruning, quantization, distillation
Efficient architectures (TinyML, MobileNet, etc.)
Carbon-aware scheduling and training (using renewable power times)
Reporting standards and transparency (ML emissions disclosure)

Key sources:
Schwartz et al. (2020) — Green AI
Pope et al. (2022) — Energy Efficiency and CO_2 in AI Research
Energy-aware AI frameworks: CodeCarbon, Carbontracker

5. Policy, Ethics, and Future Directions
The need for environmental accountability in AI research
Ethical concerns of disproportionate access to compute (AI divide)
Regulatory responses or recommendations (e.g., EU Green Deal, UNESCO AI ethics guidelines)

Key sources:
UNESCO (2021) — Recommendation on the Ethics of AI
OECD.AI policy observatory
European Commission AI Regulation (environmental provisions)

8. Prof. Paul Vasos

Timely evaluation of radiation effects on glucose metabolism by NMR

Imaging glucose metabolism by sensitivity-enhanced ('hyperpolarised') molecular NMR holds promise for early evaluation of treatment effects in oncology.
Sensitive spectroscopic methods to detect the enzymatic kinetics of endogenous molecules in response to treatment can be developed to identify appropriate biomarkers in tumoral, non-tumoral, and immune cells and in ex-vivo probes.
This Ph.D. project proposal builds on biospectroscopy contributions within our team and laboratory to bring translational developments for timely magnetic resonance-based evaluation of treatment effects.

References:
Vasos, P. R. et al. Long-lived states to sustain hyperpolarized magnetization. PNAS 106, 18469–18473 (2009).

Sarkar, R., Ahuja, P., Vasos, P. R. & Bodenhausen, G. Long-Lived Coherences for Homogeneous Line Narrowing in Spectroscopy. Phys. Rev. Lett. 104, 053001 (2010).
Sadet, A. al., and Vasos, PR Hyperpolarized water enhances two-dimensional proton NMR correlations: a new approach for molecular interactions. Journal of the American Chemical Society (2019) doi:10.1021/jacs.9b03651.
Asavei, T. al., and Vasos, PR Laser-driven radiation: Biomarkers for molecular imaging of high dose-rate effects. Medical Physics 2019

9. Prof. Bogdan Murgescu

IRTG – Natural Resources – Social-ecological systems
Sharing revenues from the extraction of natural resources. Case study (first theme)

Natural resources are an element which massively shapes economic and social development. A significant line of analysis outlines „the curse of natural resources", while other scholars insist on the possibility to build up inclusive institutions and to turn the endowment in natural resources into an economic and social asset. The thesis should analyse the institutional arrangements regarding revenue sharing between economic operators, nation-states and local communities in a concrete setting to the choice of the doctoral candidate.

Bibliographical suggestions:
Richard Auty, Sustaining Development in Mineral Economies. The Resource Curse Thesis, London and New York, Routledge, 1993.
Marc Badia-Miró, Vicente Pinilla and Henry Willebald (eds.), Natural resources and economic growth : learning from history, London and New York, Routledge, 2015.
Matthew Fairs, "Oil income and the personalization of autocratic policies". Political Science Research and Methods. 2020, 8 (1): 772–779. doi:10.1017/psrm.2019.14. S2CID 159372031.
Macartan Humphreys, Jeffrey D. Sachs and Joseph E. Stiglitz (eds.), Escaping the Resource Curse, New York: Columbia University Press, 2007.
Andreas R. Dugstad Sanders, Pål Thonstad Sandvik and Espen Storli, The Political Economy of Resource Regulation: An International and Comparative History, 1850-2015, University of British Columbia Press, 2019.

IRTG - Higher Education Studies
Patterns of academic careers (second theme)

Globalization, digitalization and post-modern institutional arrangements impact significantly higher education, both at institutional level and at the level of academic careers. The thesis should combine empirical research with systemic reflection on the different patterns of academic careers in various institutions and higher education systems.

Bibliographical suggestions:
https://education.ec.europa.eu/education-levels/higher-education/european-universities-initiative
Tony Becher and Paul Trowler, Academic Tribes And Territories: Intellectual Enquiry and the Culture of Disciplines, Philadelphia, Open University Press, 2001.
Pierre Bourdieu, Homo academicus, Paris, Les Éditions de minuit, 1984. English version available online at https://monoskop.org/images/4/4f/Pierre_Bourdieu_Homo_Academicus_1988.pdf
European Education and Culture Executive Agency, Eurydice, The European higher education area in 2024 – Bologna process implementation report, Publications Office of the European Union, 2024, https://data.europa.eu/doi/10.2797/483185
Andrew Gunn, Public Policy and Universities. The Interplay of Knowledge and Power, Cambridge: Cambridge University Press, 2022.

IRTG – Higher Education Studies
Higher education and its role in the accumulation of human capital: case study (third theme)

Human Capital is an increasingly important factor of economic and social development in the 21st century. The thesis should focus on the concrete contribution of higher education to the accumulation of human capital in a concrete country (or a group of countries) in a well defined period of time.

Bibliographical suggestions:
https://www.worldbank.org/en/publication/human-capital
Gary S. Becker, Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education, New York: National Bureau of Economic Research, 1964. Available online at https://www.nber.org/books-and-chapters/human-capital-theoretical-and-empirical-analysis-special-reference-education-first-edition
Deloitte, 2025 Global Human Capital Trends. Available online at https://www2.deloitte.com/content/dam/insights/articles/glob187692_global-human-capital-trends/DI_2025-Global-Human-Capital-Trends.pdf
ILO, World Employment and Social Outlook: Trends 2025, Geneva: International Labour Office, 2025.
Jamil Salmi, The Tertiary Education Imperative. Knowledge, Skills and Values for Development, Rotterdam: Sense Publishers, 2017.

10. Prof. Alexandru Babeş

The interaction between tumor suppressor candidate 5 (tusc5) and temperature-gated transient receptor potential channels: a possible mechanism for modulating temperature-sensing in mammals

Tusc5 (Tumor suppressor candidate 5) is a cold suppressed gene mainly expressed in the adipose tissue (AT) and involved in adipogenesis. Tusc5 is also present in primary afferent neurons from dorsal root ganglia (DRGs) neurons, including nociceptors and thermoreceptors. Considering the cold sensitivity of Tusc5 and its presence in both AT and DRGs, we hypothesise that this protein is likely to be involved in shared regulatory functions of these tissues. The transient potential receptor (TRP) family includes thermosensitive ion channels expressed in DRGs which are essential for detecting changes in ambient temperature. Our aim is to investigate the effect of Tusc5 on these channels, which could shed new light on the physiological interactions between the adipose tissue and peripheral temperature-sensing neurons.

Bibliography
Kashio M, Tominaga M. (2022), "TRP channels in thermosensation", Curr Opin Neurobiol, 75:102591.
Beaton N, Rudigier C, Moest H, Müller S, Mrosek N, Röder E, Rudofsky G, Rülicke T, Ukropec J, Ukropcova B, Augustin R, Neubauer H, Wolfrum C. (2015), "TUSC5 regulates insulin-mediated adipose tissue glucose uptake by modulation of GLUT4 recycling", Mol Metab, 28;4(11):795-810
Fazakerley DJ, Naghiloo S, Chaudhuri R, Koumanov F, Burchfield JG, Thomas KC, Krycer JR, Prior MJ, Parker BL, Murrow BA, Stöckli J, Meoli CC, Holman GD, James DE.
Aoki M, Segawa H, Naito M, Okamoto H. (2014), "Identification of possible downstream genes required for the extension of peripheral axons in primary sensory neurons", Biochem Biophys Res Commun, 445(2):357-62

11. Prof. Dragoş Iliescu

Applications of computational linguistics in psychological assessment

A considerable amount of literature has been published on relationship between psychological assessment and linguistics; more recently studies have focused on the new evolutions in computational linguistics: an interdisciplinary field that has been associated both with linguistics and computer science (machine learning).
The proposed theme taps into this gap: applications of computational linguistics in psychological assessment. Possible specific studies that can be proposed in this area include: digital measurement of adult literacy; automated item generation and/or automated item scoring for the assessment of literacy; estimations of the common latent factor ("g factor") of the various forms of literacy (e.g., linguistic, numerical, scientific, financial, civic, digital etc.); the extent to which personality traits are shaped by literacy skills (given the fact that the lexical approach to the study of personality is based on the „sedimentation hypothesis", which is an evolutionary outlook on languages); the relationship between adult and child literacy (especially digital); assessment of text readability and other text characteristics (e.g., development of a readability formula for Romanian language) etc.

References:
von Davier, A., Mislevy, R. J., & Hao, J. (2021). Computational Psychometrics. Springer.

12. Prof. Laura Grünberg

Beyond human-centric perspectives in social sciences

The doctoral theme addresses the growing epistemological and methodological interest to broaden the scope of various social science fields in order to include "more-than-human lives" and material aspects of society. The expansion of their frontiers is also part of a wider trend in academia to give voice to the "other"- to challenge dominant power structures, develop a more comprehensive understanding of social phenomena and address the limitations of anthropocentric approaches.
Material Turn (Material/Post-humanist Studies) focuses on the active role of objects, technologies, and physical environments in shaping social life, so relevant for addressing pressing environmental issues and sustainability challenges of the increased role of technology and AI in our daily lives.
Animal Turn (Human-Animal Studies) (re)considers animals as social actors and examines human-animal relationships, challenging the speciesism in social sciences. Investing efforts towards creating more inclusive and comprehensive frameworks for understanding social phenomena aligns also with the goals of Gender Studies that deals with issues of otherness, power dynamics, intersectionality, deconstructing binaries, and challenging dominant narratives.
Such trends in social science have important epistemic and methodological challenges that may be critically tackled within the doctoral research programme.

Some key authors and works:
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