Ruben Colindres

PhD Student

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Research Interests

Exposomics: Leveraging multi-omics technologies to investigate biological embodiment of exposure.

High-dimensional Mediation Analysis: Assessing the contributions of the Exposome to the underlying biology of chronic disease development.

Causal Inference and Variable Selection: Developing novel statistical methods to identify and estimate consistent, informative relationships in complex, large-scale observational studies.

Social and Molecular Epidemiology: Examining adaptive molecular mechanisms in response to social determinants to address health inequities in chronic diseases.

Effect Heterogeneity: Exploring deviations in disease susceptibility and interdependencies in exposure-disease relationships to inform targeted, equitable public health policies, and prevention strategies.

Education

School of Public Health, Imperial College London *London*

PhD Clinical Medicine Research, Molecular Epidemiology *November 2022 - Present*

- **Working Thesis Title:** 'Investigating Heterogeneous Disease Aetiologies: A High-dimensional Exposomic Mediation Analysis of Cardiovascular Disease Risk via Stability Selection Penalised Regression Models in a Structural Causal Framework'
- **Supervisors:** Prof Marc Chadeau-Hyam, Dr. Dragana Vuckovic, Dr. Julien Chiquet
- **Department:** Epidemiology and Biostatistics
- **Expected End Date:** November 2026

School of Public Health, Imperial College *London*

MSc Health Data Analytics and Machine Learning (Distinction) *October 2021 - September 2022*

- **Modules:** Introduction to Statistical Thinking and Data Analysis, Principles and Methods of Epidemiology, Clinical Data Management, Molecular Epidemiology, Machine Learning, Computational Epidemiology, Population Health Analytics and Translational Data Science.
- **MSc Thesis** 'Automated Annotation of Biological Networks by Combining Community Detection and Enrichment Analyses'
- **Group Research Project** 'Estimating the effect of the external exposome on Leukocyte Telomere Length (LTL) in the UK Biobank Cohort'

Faculty of Natural Science, Business School, Imperial College *London*

BSc Biochemistry with Management *September 2017 - July 2021*

- Year 3 Modules: Advanced Immunology, Integrative Systems Biology, Plant Biotechnology & Development, Science Communication, Science, Policy & Power.
- Year 4 Modules: Organizational Behaviour & Human Resource Management, Accounting, Business Economics, Global Business Management, Business Strategy, Marketing, Finance & Financial Management, Innovation Management, Sustainable Business, Entrepreneurship.

Professional Experience, Teaching & Supervision

School of Public Health, Imperial College London *London*

Graduate Teaching Assistant *November 2022 – Present*

- **Computational Epidemiology:**
  - Contributed to course material development, designed assessments and delivered lectures on: "High-dimensional -omics Profiling and Risk Prediction", "Advanced Graphical Modelling", "Stability Selection", and "Structural Causal Modelling".
  - supervised curriculum-integrated group research projects, with a focus on methodological rigor, scientific communication, and applied learning.
- **Translational Data Science:**
  - Delivered lectures on "Sensitivity/Stability Analysis", focusing on permutation and resampling techniques.
  - Supervised group research projects utilising real and synthetic UK Biobank data.
- **MSc Thesis Supervision:** Co-supervised 19 student projects.

Imperial College *London*

Equality, Diversity, Inclusion Co-creator *2020–2022*

- Conducted a review of the organizational culture at Imperial College
- Developed initiatives to promote equality, diversity, and inclusion, such as the Imperial Inclusion Townhalls, a community forum aimed at fostering diversity and addressing local barriers to inclusion across campus.

Stiftung der Deutschen Wirtschaft *London*

Seminar Coordinator *2019, 2020, 2026*

- Coordinated and facilitated seminars for the German Economy Foundation in London, UK, including on 'Mental Health in the Workplace' at the London School of Economics (2019), 'Human Enhancement' (2020) and 'Equitable AI' (2026) at the University of Cambridge.
- Delivered a keynote lecture on the ethical implications of CRISPR technologies.

Max Planck Institute for Neurobiology, Department of Synapses-Circuits-Plasticity *Munich, Germany*

Research Intern *July 2015*

- Conducted electrophysiological measurements on in-vitro GFP-mouse hippocampal slices to analyze long-term potentiation under the supervision of Prof. Tobias Bonhoeffer and Volker Staiger.

Awards, Fellowships, & Grants

2022 - 2026
PhD Studentship Award, Stiftung der deutschen Wirtschaft (German Economy Foundation)

2017 - 2021
Scholarship, Stiftung der deutschen Wirtschaft (German Economy Foundation), awarded for academic excellence and social engagement.

2020
Union Colours Award, Imperial College Union, awarded for significant and sustained contributions to the student experience. Recognized for my work as a departmental Well-being Representative and active involvement in two college-wide campaigns: DIVEST Imperial and ICustoo.

2025
HDRUK / Helmholtz Travel Award, facilitated a collaborative research visit to Helmholtz Munich to strengthen UK-Germany partnerships in environmental health. Delivered a seminar on consistent variable selection for high-dimensional mediation analysis and an invited lecture on stability selection methods in exposomic research.

Lectures, Courses, and Presentations

Courses

September 2024. **Exposomic Analytics:** Developed and delivered course materials, including lectures and practicals on "Stability Selection Penalized Regression", "Stability Consensus Clustering", and "Structural Causal Modelling". Nice, France

September 2023. **Expotype Summer School:** Delivered a lecture on "Structural Causal Modelling", and assisted on practicals on Exposome clustering and Expotype analysis Rome, Italy

Conferences

November 2023. **ExposomeNL:** "Improved variable selection of interactions via automated calibration of hierarchical group-lasso regularization in a stability selection framework." Utrecht, Netherlands

August 2024. **International Society for Environmental Epidemiology (ISEE):** "Improved selection of pairwise interaction effects via automated calibration of hierarchical group-LASSO regularization in a stability selection framework." Santiago, Chile

Research Collaborations

LongITools, EXPANSE, DISCERN, and STAGE *Europe*

Contributor to EU- and UKRI-Funded Research Consortia *2022 – Present*

- Presented work package progress at meetings held in Athens, Utrecht, Oslo, Lyon, Munich, Amsterdam, Gothenburg, Barcelona, Paris, Turin and Brno.
- Contributed to deliverables and supported periodic reporting, ensuring compliance with EU funding requirements and project milestones.

Skills

- **IT:** Proficient in Microsoft Office Suite, R, MATLAB, Python, and bioinformatics tools. Experienced in Frequentist and Bayesian statistical methodologies, as well as machine learning techniques.
- **Laboratory Techniques:** Skilled in flow cytometry, mass spectrometry, NMR spectroscopy, cryo-electron microscopy (Cryo-EM), biochemical and immunological assay techniques, cell culture, chromatography, genome editing methods, PCR, fluorescence spectroscopy, and other molecular profiling techniques.
- **Languages:** German (Native), English (CEFR Level C1, certified by IELTS in 2017), Latin (Advanced proficiency, certified by the "Großes Latinum"), Ancient Greek (Proficiency certified by the "Graecum").