Lucas Resck

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Education

University of Cambridge, Language Technology Lab *Cambridge, UK*
PhD in Computation, Cognition and Language *Oct 2024 – Sept 2028*
- Supervisors: Profs. Anna Korhonen and Isabelle Augenstein (University of Copenhagen)
- Affiliations: ELLIS PhD Student, Cambridge Trust Scholar, Girton College Member

Getulio Vargas Foundation (FGV), Visual Data Science Lab *Rio de Janeiro, Brazil*
MSc in Mathematical Modelling *Feb 2022 – May 2024*
- Supervisors: Profs. Jorge Poco and Marcos Raimundo (State University of Campinas, Brazil)

Rice University; Visual, Language, and Learning Lab *Houston, US*
Visiting Scholar in Computer Science *Oct 2022 – Dec 2022*
- Supervisor: Prof. Vicente Ordóñez

Getulio Vargas Foundation (FGV) *Rio de Janeiro, Brazil*
BSc in Applied Mathematics *Dec 2017 – Jan 2022*
- Supervisor: Prof. Jorge Poco
- 1st in class, GPA 3.86/4.0 (9.66/10.0, lowest passing grade of 6)

Federal Center for Technological Education of Minas Gerais (CEFET-MG) *Varginha, Brazil*
Technician Diploma in Mechatronics *2015 – 2017*
- High school researcher fellow and volunteer

Research Projects

Survey on explainability and interpretability of multilingual LLMs *Nov 2024 – present*
- Surveyed 200+ papers on multilingual explainability (preprint available).
- Categorised existing literature according to the explainability techniques employed, the multilingual tasks addressed, the languages investigated and available resources.
- Identified key challenges, distilled core findings and outlined promising avenues for future research.

Improving NLP model explanations using human annotations *Dec 2021 – Mar 2024*
- Developed a novel contrastive-inspired loss to incorporate human annotations into NLP classification in a model- and explainer-agnostic way (**NAACL Findings 2024**, LatinX in NLP, MSc thesis).
- Employed a multi-objective optimizer to explore the trade-off between the contrastive and the original losses.
- Significantly improved the plausibility of post-hoc explanations (relative increase of 3.49% for a language model) without substantially degrading model performance.

Design of a novel explainer for GNN node classification *July 2022 – Jan 2023*
- *Distill n' Explain* (**AISTATS 2023**) first distills the original GNN into an interpretable one and then explains the latter.
- Designed and proved lemmas and theorems that guarantee the method's explanation faithfulness.
- The proposed explainer outperformed previous methods in explanation accuracy while being orders of magnitude faster.

Development of a visual analytics system to explore citations in legal documents *Aug 2020 – Feb 2022*
- *LegalVis* (**TVCG 2023**, **VIS 2022**, BSc thesis) employs ML, NLP, XAI and data visualization to infer non-explicit citations in Brazilian legal documents.
- Tested a diverse set of NLP classifiers (Transformers, word embeddings and bag-of-words) and achieved high accuracy (96%) in identifying citations.
- Employed a model-agnostic explainer (LIME) to explain the inferred citations.

Development of a visual analytics system to apply legal understandings *Feb 2022 – present*
- *LegalAnalytics* (**AI & Law 2025**) employs ML, NLP, XAI and visualization methods to assist judicial experts in the application of understandings from the Brazilian Supreme Court.
- Conducted a literature review on XAI in the legal domain (under review).

Application of machine learning to binding precedents *June 2021 – Apr 2025*

- Explored ML, NLP and topological data analysis in legal documents that cite Brazilian binding precedents (**AI & Law 2025**).
- Managed the annotation of legal documents by experts (contribution to other papers).

Study of legal language models with topological data analysis *Apr 2023 – Sept 2024*

- Exploration of the intersection between NLP and topological data analysis in legal documents.
- Publications expected in 2025.

Study of training data attribution *Oct 2022 – Sept 2024*

- Explored methods to attribute model predictions to training data.
- Investigated the intersection between attribution, datamodeling and machine unlearning.

Publications

Lucas Resck, Isabelle Augenstein and Anna Korhonen. 2025. Explainability and Interpretability of Multilingual Large Language Models: A Survey. OpenReview. Preprint.

Raphaël Tinarrage, Henrique Ennes, **Lucas Resck**, Lucas T. Gomes, Jean R. Ponciano and Jorge Poco. 2025. Empirical analysis of binding precedent efficiency in Brazilian Supreme Court via case classification. **Artificial Intelligence and Law**.

Lucas Resck, Felipe Moreno-Vera, Tobias Veiga, Gerardo Paucar, Ezequiel Fajreldines, Guilherme Klafke, Luis G. Nonato and Jorge Poco. 2025. LegalAnalytics: bridging visual explanations and workload streamline in Brazilian Supreme Court appeals. **Artificial Intelligence and Law**. Accepted for publication.

Lucas Resck, Marcos M. Raimundo and Jorge Poco. 2024. Exploring the Trade-off Between Model Performance and Explanation Plausibility of Text Classifiers Using Human Rationales. **NAACL Findings 2024**. Also presented as a poster at the LatinX in NLP at NAACL 2024 workshop.

Lucas E. Resck, Jean R. Ponciano, Luis Gustavo Nonato and Jorge Poco. 2023. LegalVis: Exploring and Inferring Precedent Citations in Legal Documents. IEEE Transactions on Visualization and Computer Graphics (**TVCG 2023**). Presented at **VIS 2022**.

Tamara Pereira, Erik Nascimento, **Lucas E. Resck**, Diego Mesquita and Amauri Souza. 2023. Distill n' Explain: explaining graph neural networks using simple surrogates. **AISTATS 2023**.

Theses and Reports

Lucas Emanuel Resck Domingues. 2024. Balancing performance and explanation plausibility: a multi-objective approach to text classification with human rationales. MSc thesis, Getulio Vargas Foundation, Rio de Janeiro, Brazil.

Lucas Emanuel Resck Domingues. 2021. Inferring and Explaining Potential Citations to Binding Precedents in Brazilian Supreme Court Decisions. BSc thesis, Getulio Vargas Foundation, Rio de Janeiro, Brazil.

Lucas Emanuel Resck Domingues and Júlia Gandini Blahun. 2018. Circuits for Driving Low Power Direct Current Motors. Technical report, Federal Center for Technological Education of Minas Gerais, Varginha, Brazil.

Júlia Gandini Blahun, Luiza de Souza Pinto Regina and **Lucas Emanuel Resck Domingues**. 2016. Brazilian Robotics Olympiad – OBR'2016, Level II Practical Modality. Technical report, Federal Center for Technological Education of Minas Gerais, Varginha, Brazil.

Contribution to Other Papers

Beatriz Sabdin Chagas, Carla Marcondes Damian and Raphäel Tinarrage. 2022. The Impact of the Súmula Vinculante 26 on the Decrease of Similar Demands at the STF: a Quantitative Analysis With Machine Learning Models. XI International Meeting of CONPEDI. Law team: Beatriz Sabdin Chagas, Carla Marcondes Damian, Ana Clara Macedo Jaccoud, Pedro Burlini de Oliveira. Math team: Henrique Hennes, Jorge Poco, Jean Roberto Ponciano, **Lucas Resck**, Raphäel Tinarrage.

Ana Clara Macedo Jaccoud, Pedro Burlini de Oliveira and Raphäel Tinarrage. 2022. Regime Progression for Heinous Crimes in Brazilian Supreme Court (STF): an Empirical Analysis of Súmula Vinculante 26. XI International Meeting of CONPEDI. Law team: Beatriz Sabdin Chagas, Carla Marcondes Damian, Ana Clara Macedo Jaccoud, Pedro Burlini de Oliveira. Math team: Henrique Hennes, Jorge Poco, Jean Roberto Ponciano, **Lucas Resck**, Raphäel Tinarrage.

Teaching Experience

Professor *Rio de Janeiro, Brazil*
Getulio Vargas Foundation (FGV) *Jan 2023 – Apr 2023*

Professor of Introduction to Programming in Python in a Web Systems Development course.

Teaching Assistant *Rio de Janeiro, Brazil*
Getulio Vargas Foundation (FGV) *Mar 2020 – June 2021*
Teaching assistant of Ordinary Differential Equations, Calculus in Several Variables and Calculus in One Variable.

Work Experience

Summer Intern *Rio de Janeiro, Brazil*
EloGroup *Dec 2019 – Feb 2020*
Conducted time series analysis, exploratory data analysis, sanity checks on databases and data preprocessing.

Summer Intern *Rio de Janeiro, Brazil*
PSR *Jan 2019 – Feb 2019*
Developed and implemented optimization models for maintenance schedules and dispatch of power plants, utilizing Julia and optimization packages.

Honours, Awards and Scholarships

ELLIS PhD Student *Oct 2024 – Sept 2028*
PhD student under the ELLIS PhD & Postdoc Program.

Cambridge International Scholarship *Oct 2024 – Sept 2027*
Cambridge Trust's scholarship to cover tuition fees and maintenance costs.

Young Researcher *Sept 2024*
11th Heidelberg Laureate Forum (HLF) Young Researcher.

G-Research scholarship *Paris, France*
Registration and travel grant for EDS 2024. *Aug 2024*

Google and Zendesk scholarship *Lisbon, Portugal*
Registration and travel grant for LxMLS 2024. *July 2024*

NAACL Diversity and Inclusion Award *Mexico City, Mexico*
Registration and partial travel grant for NAACL 2024. *June 2024*

MSc scholarship *Feb 2022 – May 2024*
FGV scholarship: tuition fees and monthly stipend.

Invited speaker *Três Corações, Brazil*
Presentation *How the mathematics olympiads transformed my life* to motivate students from Colégio União, invited by Prof. Aguinaldo Borba. *Mar 2023*

CAPES PROSUP scholarship *May 2022 – Feb 2023*
Coordination for the Improvement of Higher Education Personnel (CAPES)'s Graduate Support Program for Private Education Institutions (PROSUP) scholarship to partially cover tuition fees.

Academic distinguished undergraduate award *Apr 2022*
Ranked 1st in my undergraduate class. Recognition of academic excellence (grades and research).

Talent Selection Program *Dec 2017 – Jan 2022*
Hosted by the Center for the Development of Mathematics and Sciences of FGV.
- Scholarship holder (tuition fee and monthly stipend).
- Selected based on my performance in mathematical olympiads and the entrance exam.

PICME scholarship *Aug 2018 – July 2021*
Undergraduate Research and Master's Program (PICME) scholarship.
- It was only possible because of my mathematical olympiad medals before college.
- I did research and took graduate courses during my undergraduate studies with a scholarship.

High School Research Fellowship *Mar 2017 – Feb 2018*
Scholarship holder at CEFET-MG and the National Council for Scientific and Technological Development (CNPq) in the High School Research Fellowship.

1st place in the FGV entrance exam *Nov 2017*
1st place in the entrance exam for the Applied Mathematics undergraduate program (24 candidates).

Olympiad medals *2012 – 2017*

- Brazilian Public School Mathematics Olympiad (OBMEP): Gold (1 medal), silver (3) and bronze (1) medals and honourable mention (1).
- Brazilian Astronomy and Astronautics Olympiad (OBA): Silver (2) and bronze (1) medals.

Skills

Programming: Python, C++, Julia, R, MATLAB/Scilab, LaTeX

Machine Learning: PyTorch, scikit-learn, HuggingFace Transformers, TensorFlow, Keras

Technologies: Git, Pandas, NumPy, Linux

Languages: English (fluent, TOEFL: 112/120), Portuguese (native)

Other: First Aid for Sport (British Red Cross)

Volunteering

Cambridge University Brazilian Society (CUBS) *Cambridge, UK*
Communications Officer. *Dec 2024 – present*

FAccT 2024 *Rio de Janeiro, Brazil*
Volunteer at the ACM Conference on Fairness, Accountability, and Transparency 2024. *June 2024*

Academic Directory of Applied Mathematics at FGV *Aug 2018 – Aug 2019*
Treasurer.

International Congress of Mathematicians (ICM) 2018 *Rio de Janeiro, Brazil*
Volunteer at the ICM 2018. *Aug 2018*

Events, Schools and Workshops Attended

11th Heidelberg Laureate Forum (HLF) *Heidelberg, Germany*
Selected as a Young Researcher and presented an artistic work at the Intercultural Science Art Project. *Sept 2024*

ELLIS Doctoral Symposium (EDS) 2024 *Paris, France*
Presentation of a poster of the **NAACL Findings 2024** paper. *Aug 2024*

Lisbon Machine Learning School (LxMLS) 2024 *Lisbon, Portugal*
Presentation of a poster of the **NAACL Findings 2024** paper. *July 2024*

NAACL 2024 and LatinX in NLP *Mexico City, Mexico*
Paper presentation. *June 2024*

FAccT 2024 *Rio de Janeiro, Brazil*
Volunteer. *June 2024*

Tropical Probabilistic AI School 2024 *Rio de Janeiro, Brazil*
Presentation of a poster of the **NAACL Findings 2024** paper. *Jan 2024*

Seminar for Postgraduate Students at FGV (SEPEMAp) *Rio de Janeiro, Brazil*
Presentation of the **NAACL Findings 2024** paper. *Oct 2023*

XLII Brazilian Congress of Applied and Computational Mathematics (CNMAC 2023) *Bonito, Brazil*
Sept 2023

Latin American Congress on Industrial and Applied Mathematics (LACIAM) 2023 *Rio de Janeiro, Brazil*
Jan 2023

Summer School on Data Science 2023 *Rio de Janeiro, Brazil*
Jan 2023

IEEE VIS: Visualization & Visual Analytics 2022 *Oklahoma City, US*
Presentation of the **TVCG 2023** paper. *Oct 2022*

8th Workshop on Mathematical Solutions for Industrial Problems *São Paulo, Brazil (virtual)*
Organised by the Research Center in Mathematics Applied to Industry (CeMEAI) at the University of São Paulo. *Mar 2022*

International Congress of Mathematicians (ICM) 2018 — *Rio de Janeiro, Brazil*
Volunteer. *Aug 2018*

High School Research Course (Mentores) — *Virtual*
Scholarship holder (CNPq) at the Plane Analytical Geometry course for medalists of OBMEP. *2016*

High School Research Program (PIC-Jr) — *Varginha, Brazil*
Scholarship holder (CNPq) at the mathematics course for medalists of OBMEP. *2013 – 2015*