# Marian-Andrei RIZOIU

**address:** CB02.12, UTS, 15 Broadway, Ultimo NSW 2007

**email:** Marian-Andrei.Rizoiu@uts.edu.au

**ORCID:** orcid.org/0000-0003-0381-669X

**Lab page:** www.behavioral-ds.science

**Google Scholar:** scholar.google.com/citations?user=J9sjxXYAAAAJ

**The Conversation profile:** theconversation.com/profiles/marian-andrei-rizoiu-850922

**Professional page:** www.rizoiu.eu

# CURRICULUM VITAE

**About me**
I am a behavioural data scientist with a deep interest in understanding and modelling online human actions. I am the founder of the Behavioral Data Science lab within the UTS Data Science Institute.

**Research interests**
- Stochastic behavioural modelling; online information diffusion; online popularity modelling.
- Detecting disinformation campaigns and malicious activity, information warfare, online influence and disruptive socialbots in democratic processes.
- Labour markets in automation age, measuring skill similarity, labour upskilling, job ads data.

## Employment history

**08/2021 – current:** **Senior Lecturer,** Data Science Institute, University of Technology Sydney
*Research*: information diffusion models, mis-/disinformation detection, online influence operations
*Supervision*: 1 postdoc, 7 PhD students, 2 Masters/Honours students.

**2019:** **Visiting Professor**, Jean Monnet University & CNRS Hubert Curien lab, Saint-Etienne, France
*Research*: dynamics of online polarisation

**2019 – 2021:** **Lecturer,** Faculty of Engineering and IT, University of Technology Sydney
*Research*: information diffusion models, online popularity prediction models, stochastic processes
*Supervision*: 1 postdoc, 4 PhD students, 3 Masters/Honours students/Research Assistants.

**2016 – 2019** **Research Fellow, Lecturer,** Eng. and Comp. Science, Australian National University
*Research*: information diffusion models, online popularity prediction models, stochastic point processes, machine learning and social media analysis.
*Teaching*: Document Analysis, Advanced Databases and Data Mining (Bachelors/Masters).
*Leadership*: course convener for the Document Analysis course, co-PI for two research grants,
*Supervision*: 4 PhD students (2 as main supervisor), 3 Masters/Honours students.

**2014 – 2016** **Research Scientist,** Optimisation Research Group, National ICT Australia (NICTA)
*Research:* online privacy, big social data analytics, data mining.
*Supervision*: 2 PhD students, 1 Masters/Honours student.

**2013 – 2014** **Postdoctoral Fellow,** ERIC laboratory, Lumière University Lyon, France.
*Research*: ontology construction from text, knowledge graphs evolution for brand management.
*Teaching*: Machine Learning, Software Development Methodologies, Data Mining, Object Oriented Programming, Unix Operating Systems, Calculus software (course convener)
*Supervision*: 4 Honours theses, 9 industrial internships.
*Leadership:* developed the Machine Learning course.

## Education background

**2009 – 2013** (June 24th 2013) **PhD in Computer Science**, Lumière University Lyon, France.
"Semi-supervised structuring of complex data", supervision S. Lallich and J. Velcin.

**2008 – 2009** (double diploma) **Masters Degree in Data Mining and Knowledge Engineering,** Polytechnic School, Nantes University, France.

**2004 – 2009** **Engineer Degree in Systems and Computer Engineering** School of Computer Science, Polytechnic University of Bucharest, Romania.

## Grants, Projects and Consulting – AU$1.05M in secured funding ($330K as lead-CI)

| 2021: | Polish National Science Centre OPUS grants, "**Streaming social data**", AU$313K, CI. Model the dynamics of social interactions using data streams and complex networks theory. |
| --- | --- |

2021:      UTS Cross-Faculty Scheme, "**The dynamics of disinformation across traditional and social media**", AU$37K, Lead-CI. Understand the dynamic interaction between the traditional and social media ecosystems that results in the flow of disinformation and problematic content.

2021 – 2022:      Defence Science and Technology (DST). **"Forensic analysis and real-time detection of disinformation campaigns"**, AU$100K, Lead-CI. Real-time detection of disinformation campaigns using multi-faceted social media analysis.

2020-2021:      Facebook Research grants, **"Using computational modelling of user behaviour and machine learning to counter the diffusion of hate speech across social media"**, US$60k, CI. Use ethnographic methods to identify and monitor a number of persona associated with hate speech diffusion targeting vulnerable populations.

2019 – 2020:      National Security College's Green policy grants, "**Tracking Disinformation Campaigns Across Terrains: Implications for Policy**", AU$50K, CI. Quantify the scale of the problem of disinformation in order to co-design responses with policy partners.

2019 – 2020:      UTS Cross-Faculty Scheme, "**SocialSense: Making sense of the opinions and interactions of online users**", AU$20K, CI. Study the diffusion and polarization of opinions online, mixing an ethnographic approach with computational modelling of behaviour.

2019:      Science and Industry Endowment Fund, "**Adaptive skills taxonomy to enable labour market agility**", AU$350K, CI. Understand the change of demand and supply of skills in a timely and efficient manner in order to provide information to inform employment decisions.

2019      Industrial consulting with a merger/acquisition. AU$10.5k, Lead-CI.

2018      ANU Social Science Cross-College Grants, **"Advanced tools and methods for analysing the role and influence of bots in social media"**, AU$50K, Lead-CI. The impact of automation in the form of socialbots on deliberative democracy – how socialbots hijack the public discourse.

2018      ANU Social Science Cross-College Grants, **"Identify Hate Speech and Predict Mass Atrocities"**, AU$30K, Lead-CI. Can "hate speech" be reliably measured to predict political violence?

# Honours, prizes and awards

| 11/2020 | **PitchFest award for implementable disinformation prototype.** NSW Smart Sensing Network & Klarrio Ltd. |
| --- | --- |
| 03/2019 | **CNRS IDEXLYON award for research excellence**. French National Research Agency, project ANR-16-IDEX-0005. |
| 04/2018 | **Travel Awards** – to travel to WWW'18. ANU Early Career Researchers grant scheme |
| 06/2015 | **Travel Awards** – to travel to ECML-PKDD'15. ANU Early Career Researchers grant scheme |
| 01/2015 | **NVIDIA Titan GPU**. NVIDIA GPU Awards Program |
| 05/2013 | **Postgraduate travel grant.** Rhône-Alpes local government |
| 11/2012 | **Best student paper award.** IEEE 24th International Conference on Tools with Artificial Intelligence, Athens, Greece |
| 06/2009 | **ERASMUS International student exchange award.** European Erasmus exchange program – competitive scheme |

# Professional service

| Area chair / PC member | Area Chair: ECML-PKDD'21 '22<br>PC member: WWW'20'21'22, AAAI'20'22, AAAI'19'21, ICWSM'19-'22, KDD'22 |
| --- | --- |
| Reviewing | Journal of Machine Learning Research, Journal IEEE Transactions on Multimedia, Computational Intelligence, Transactions on Information Systems, Journal Transactions on Knowledge Discovery from Data; conferences WWW, ICWSM, NIPS, AAAI. |
| Conference | **10/2012:** Discovery Science 2012 and Algorithm Learning Technology 2012, Lyon. |

**organisation**   **09/2011**: Web Intelligence 2011 and Intelligent Agent Technology 2011, Lyon.

# Invited talks

I gave more than 40 invited talks to varied industrial, academic and government stakeholders, such as to Silicon Valley tech companies (Facebook, Netflix), international universities and research labs, and Australian governmental institutions. See a selection:

09/2021   Occupation transition recommender systems. **LinkedIn Tech Talk Series**.

11/2020   Career transitions and managing labour supply and demand. **Reserve Bank of Australia**.

10/2020   Fighting the proliferation of problematic speech on online social networks. **Facebook Content Policy and Moderation**, Palo Alto, California, USA.

09/2020   Skill shortages and worker transitions. **Victoria government, Department of Jobs, Precincts and Regions**, Melbourne, Australia.

04/2020   Career Development Recommender System & COVID implications for employment. **New South Wales Treasury**, Sydney, Australia.

04/2020   Skills and employment in times of COVID-19. **Department of Education, Skills and Employment, Australian Federal Government**, Canberra, Australia.

11/2019   Information warfare: socialbots and Russian online trolls in the US elections. Invited talk at the **Defence Science and Technology (DST)**, Adelaide, Australia.

05/2019   #DebateNight: Role of Twitter Socialbots During US Presidential Debate. Invited talk at the **Computer Society of the IEEE ACT Section**, Canberra, Australia.

07/2019   Studying Online Video Popularity with Computational Models. **Sage Research Methods.**

06/2018   Hawkes Intensity Processes for modelling online popularity and virality. Invited talk at **Facebook Core Research**, Palo Alto, California, USA.

06/2018   User engagement with online video and the unpredictability of online popularity. Invited talk at **Netflix Research**, San Jose, California, USA.

05/2018   Scalable influence estimation from online information diffusions. Research visit at the **Max Plank Institute for Software Systems**, Kaiserslautern, Germany.

03/2016   Evolution of Privacy Loss in Wikipedia. Invited talk, March session of the Monthly **Wikimedia Research Showcase**, San Francisco, USA.

# Media engagement and outreach

**The Conversation –** I wrote 5 articles for The Conversations, that amassed more 109,000 reads (source: The Conversation, 15/04/2022), were reposted on websites such as World Economic Forum and BBC and got significant attention on social media.

08/2021   How AI can help choose your next career and stay ahead of automation

04/2021   We spent six years scouring billions of links, and found the web is both expanding and shrinking

03/2020   Coronavirus infecting Australian jobs: vacancy rates down since early February

12/2019   Robot career advisor: AI may soon be able to analyse your tweets to match you to a job

10/2019   Can hiding likes make Facebook fairer and rein in fake news? The science says maybe

**Radio**

09/2021   **2ser radio** – Streamers go dark over hate raids

09/2021   **2ser radio** – How AI Is Helping Aussies Avoid Automation

05/2021   **Radio Adelaide** Breakfast show – The Internet Is Massive and Small

10/2020   **Syn Media** – News Talks #11: How social media spreads misinformation

11/2019   **2ser radio** – Facebook and Fake News

10/2019   **ABC radio** – Hiding likes make Facebook fairer

10/2019   **Radio Adelaide** – Hiding the Number Of Likes On Social Media

**Media coverage –** My research received significant media attention – 16 of my papers were covered by 84 news and blogs, 1 policy document, 4 Wikipedia pages and 878 mentions on social media (source: Altmetric 25/05/2021). Selected examples (see **full list of media coverage here**):

08/2021 **World Economic Forum** – Fancy a career change? AI could help you decide your next move

08/2021 **LinkedIn News Australia** – Want to pivot careers? Ask AI

05/2021 **World Economic Forum** – What these researchers discovered after studying the internet for 6 years

05/2021 **RT News** – 60-70% of world's attention focused on just 10 online domains, according to latest research

05/2021 **Science Alert** – The Same Handful of Websites Are Dominating The Web And That Could Be a Problem

05/2021 **Canaltech Brasil** – Internet mundial cresce ao mesmo tempo em que está cada vez menor; entenda

03/2021 **ABC News** – Facebook promised to ban anti-vaxxers. But are still up and they've been selling t-shirts

02/2020 **Bloomberg Businessweek** – The Best Way to Change Your Job Is to Focus on Your Personality

02/2020 **Nature Index** – Scientists are curious and passionate and ready to argue

02/2020 **BBC** – How your Twitter feed could help find your dream job

## Community Contributions

03/2021 My paper "Layoffs, Inequity and COVID-19" [4] was used as evidence in the Senate inquiry into media diversity by Marcus Strom, the president of Media Entertainment and Arts Alliance (submission 26).

10/2020 I consulted the Facebook's Content Policy and Regulation team, who is looking for means to automatise their content moderation.

01/2020 I served as an expert for the **Council of Attorneys General of New South Wales (NSW)** for the defamation law reform. The NSW government sought to develop their understanding of digital communications issues related to defamation and assist their development of potential reforms. I was the only computer scientist at the table and gave insights into the online social networks and internet service providers' technical affordances. The law reform proposal voted into law on the 6th of August 2020

# Selected recent publications

**Publications summary:** 53 peer reviewed publications (15 first author, 15 senior author), 1065 citations, H-index 16 (source: *Google Scholar 04/2022*). Full publication list at https://www.behavioral-ds.science/publication/

[1] **Rizoiu, M.-A.**, Soen, A., Li, S., Calderon, P., Dong, L., Menon, A. K., & Xie, L. (2022). *Interval-censored Hawkes processes*. **Journal of Machine Learning Research** (in press) http://arxiv.org/abs/2104.07932

[2] Dawson, N., Williams, M.-A., & **Rizoiu, M.-A.** (2021). *Skill-driven recommendations for job transition pathways*. **PLOS ONE**, 16(8), e0254722. https://doi.org/10.1371/journal.pone.0254722

[3] McCarthy, P. X., Gong, X., Eghbal, S., Falster, D. S., & **Rizoiu, M.-A.** (2021). *Evolution of diversity and dominance of companies in online activity*. **PLOS ONE**, 16(4), e0249993. https://doi.org/10.1371/journal.pone.0249993

[4] Dawson, N., Molitorisz, S., **Rizoiu, M.-A.**, & Fray, P. (2021). *Layoffs, inequity and COVID-19: A longitudinal study of the journalism jobs crisis in Australia from 2012 to 2020*. **Journalism**. p. 146488492199628

[5] Kong, Q., **Rizoiu, M.-A.**, & Xie, L. (2020). *Describing and Predicting Online Items with Reshare Cascades via Dual Mixture Self-exciting Processes.* In Proceedings of the 29th ACM International Conference on Information & Knowledge Management (**CIKM'20**), pp. 645–654, New York.

[6] Kong, Q., **Rizoiu, M.-A.**, & Xie, L. (2020). *Modeling Information Cascades with Self-exciting Processes via Generalized Epidemic Models.* In ACM International Conference on Web Search and Data Mining (**WSDM'20**). Houston, Texas.

[7] Zhang, R., Walder, C., & **Rizoiu, M.-A.** (2020). *Variational Inference for Sparse Gaussian Process Modulated Hawkes Process*. In the AAAI Conference on Artificial Intelligence (**AAAI'20**), 34(04), 6803–6810.

[8] Zhang, R., Walder, C., Bonilla, E. V., **Rizoiu, M.-A.**, & Xie, L. (2020). *Quantile Propagation for Wasserstein-Approximate Gaussian Processes. In Conference on Neural Information Processing Systems* (**NeurIPS'20**).

[9] Kern, M. L., McCarthy, P. X., Chakrabarty, D., & **Rizoiu, M.-A.** (2019). *Social media-predicted personality traits and values can help match people to their ideal jobs.* Proceedings of the National Academy of Sciences (**PNAS**), 201917942.

[10] Zhang, R., Walder, C., **Rizoiu, M.-A.**, & Xie, L. *Efficient Non-parametric Bayesian Hawkes Processes.* In: International Joint Conference on Artificial Intelligence (**IJCAI'19**), Macao, China, 2019.

[11] **Rizoiu, M.-A.**, Mishra, S., Kong, Q., Carman, M., & Xie, L. *SIR-Hawkes: Linking Epidemic Models and Hawkes Processes to Model Diffusions in Finite Populations*. In: Proceedings of International Conference on World Wide Web (**WWW '18**), Lyon, France, pp. 1–9, 2018.

[12] **Rizoiu, M.-A.**, Graham, T., Zhang, R., Zhang, Y., Ackland, R. J., & Xie, L, *#DebateNight: The Role and Influence of Socialbots on Twitter During the 1st U.S. Presidential Debate.* In International AAAI Conference on Web and Social Media (**ICWSM'18**), pp. 1–10, 2018.

[13] **Rizoiu, M.-A.**, Xie, L., Sanner, S., Cebrian, M., Yu, H., & Van Hentenryck, P., *Expecting to be HIP: Hawkes Intensity*

*Processes for Social Media Popularity*. In: Proceedings of International Conference on World Wide Web **(WWW '17)**, Perth, Australia,  pp. 735-744, 2017.

[14] **Rizoiu, M.-A.**, Xie, L., Caetano, T., & Cebrian, M., *Evolution of Privacy Loss in Wikipedia.* In: Proc. International Conference on Web Search and Data Mining **(WSDM '16),** San Francisco, USA, pp. 215-224, February 2016.