Daniel Ernesto Acuña

(publishes as Daniel E. Acuna)
Nationality: Chilean with permanent US residency ("green card")

312 Hinds Hall
School of Information Studies
Syracuse University
Syracuse, NY 13210

Science of Science and Computational Discovery Lab
205 Hinds Hall
Lab website: https://scienceofscience.org

Appointment

Syracuse University — Syracuse, NY — 2016 – present
Assistant Professor, School of Information Studies

Education

Northwestern University & RIC — Chicago, IL — 2011 – 2016
Postdoctoral Researcher in the Sensory Motor Performance Program at RIC
Research Affiliate in the Biomedical Engineering Department and the School of Engineering and Applied Science at Northwestern University
PI: Dr. Konrad Kording

University of Minnesota — Minneapolis, MN — 2011
Ph.D. in Computer Science
Thesis: Rational analysis of sequential decision-making in humans and machines
Advisor: Dr. Paul Schrater

University of Santiago — Santiago, Chile — 2004
Bachelors and Master's in Computer Science
Thesis: An algorithm for the Traveling Salesperson Problem based on players of a computer game

Honors and awards

- Best poster award, Metascience 2019 (with Han Zhuang) — 2019
- Probabilistic Models of Cognition (IPAM School – UCLA, 1-week full-tuition and lodging) — 2011
- NIH Neuro-physical-computational Sciences (NPCS) Graduate Training Fellowship (1R90 DK71500-04, full tuition, stipend, conference travel expenses) — 2008 – 2010
- International Graduate Student Fellowship of the Chilean Council of Scientific and Technological Research and the World Bank (stipend, books) — 2006 – 2010
- NIPS 2009 travel award — 2008

Funding

- Sloan Foundation: Does Government Funding Change What You Do? The Effects of Funding on the Direction and Impact of Academic Energy Research (co-PI with David Popp, $145,467 [SU $349,380]) 2020 – 2023
- DHHS-Office of Research Integrity: (Conference grant) Computational Research Integrity Conference (CRI-CON) (sole PI, $ 50,000) 2019 – 2021
- DHHS-Office of Research Integrity: Human-centered automatic tracing, detection, and evaluation of image and data tampering (sole PI, $ 150,000) 2019 – 2021
- NSF-SCISIP: Collaborative Research: Social Dynamics of Knowledge Transfer Through Scientific Mentorship and Publication (PI, $ 176,475, co-PI Stephen David) 2019 – 2021
- DARPA: Systematizing Confidence in Open Research and Evidence (SCORE) (Subcontractor, $ 7,672,188 [SU $ 129,552], leader is Center for Open Science) 2019 – 2021
- DHHS-Office of Research Integrity: Methods and tools for scalable figure reuse detection with statistical certainty reporting (sole PI, $150,000) 2018 – 2020
- NSF-SCISIP: Optimizing Scientific Peer Review (PI, $531,339 [SU: $ 214,144] co-PI with Konrad Kording and James Evans) 2018 – 2021
- NSF EAGER: Improving scientific innovation by linking funding and scholarly literature (Sole PI, $ 168,711) 2016 – 2018
- Microsoft Azure Research Award ($ 20,000) 2015 – 2016
- University of Chicago's Knowledge Lab Grant (co-I) "Optimizing scientific peer review" 2014 – 2016
- Amazon AWS Educational Grant "Automatic detection of figure element reuse in biological sciences" ($ 19,850) 2014 – 2015

Publications

Under review

- Han Zhuang and Daniel E. Acuna, "Most published research findings may be false but some of them are still worth continuing"
- Daniel E. Acuna and Ziyue Xiang, "Estimating probability of image features to support figure element reuse investigations"
- Ziyue Xiang and Daniel E. Acuna, "Scientific image tampering detection based on noise inconsistencies: A method and datasets"
- Han Zhuang and Daniel E. Acuna, "The effect of novelty on the future impact of scientific grants"
- Achakulvisut, T, Bhagavatula, C, Acuna, DE, Kording, K, "Claim extraction in biomedical publications using deep discourse model and transfer learning, Link"
- Tong Zeng and Daniel E. Acuna, " Modeling citation worthiness by using attention-based Bidirectional Long Short-Term Memory networks and interpretable models"

Journal articles

1. Zeng, T., Wu, L., Bratt, S., Acuna, DE, (2020) Assigning credit to scientific datasets using article citation networks, Journal of Informetrics
2. Acuna, DE, Brookes, P, Kording, K "Automatic detection of figure element reuse in biological science articles" (2018), BioArxiv
3. Líenard, JF, Achakulvisut, T, Acuna, DE, David, SV (2018) "Intellectual Synthesis in Mentorship Determines Success in Academic Careers", Nature Communications
4. Teplitskiy, M, Acuna, DE, Elamrani-Raoult, A, Körding, K, Evans, J, (2018) The Social Structure of Consensus in Scientific Review, Research Policy
5. Taraz G. Lee, Acuna, DE, K. P., Grafton, S. T. (2018) "Limiting motor skill knowledge via incidental training protects against choking under pressure", Psychonomic Bulletin & Review
6. Shema, A, Acuna, DE, Show Me Your App Usage and I Will Tell Who Your Close Friends Are: Predicting User's Context from Simple Cellphone Activity, CHI 2017, Pages 2929-2935, Denver, Colorado
7. Ramkumar, P, Acuna, DE, Berniker, M, Grafton, S, Turner, RS, Kording, K (2016) "Chunking as the result of an efficiency computation trade-off", Nature Communications
8. Achakulvisut, T, Acuna, DE, Ruangrong, T and Kording, K (2016) "Science Concierge: A Fast Content-Based Recommendation System for Scientific Publications." PLoS One 11(7): e0158423.
9. Ethier, C, Acuna, DE, Solla, S, Kording, K, Miller, L "Adaptive Neuron-to-Muscle Decoder Training for FES Neuroprostheses", Journal of Electrophysiology
10. Acuna, DE, Berniker, M, Fernandes, H, Kording, K (2015) "Using psychophysics to ask if the brain samples or maximizes", *Journal of Vision 15(3): 7*
11. Lancichinetti, A, Sirer, MI., Wang, J. X, Acuna, DE, Kording, K., Amaral, LAN, (2015) "A high-reproducibility and high-accuracy method for automated topic classification", *Phys. Rev. X 5, 011007*
12. Acuna, DE, Wymbs, Nicholas F, Reynolds, Chelsea A., Picard, N, Turner, RS, Strick, PL, Grafton, ST, Kording, KP (2014) "Multi-faceted aspects of chunking enable robust algorithms", *Journal of Neurophysiology Vol. 112 no. 8, 1849-1856*
13. Acuna, DE, Penner, O, Orton CG, (2013) "The future h-index is an excellent way to predict scientists' future impact", *Med. Phys.* 40, 110601
14. Acuna, DE, Allesina, S, Kording, KP (2012) "Future impact: Predicting scientific success", *Nature, Volume 489, Number 7415, 201-202*
15. Avraham, G, Nisky, I, Fernandes HL, Acuna, DE, Kording, KP, Loeb, GE, Karniel A. (2011) "Towards perceiving robots as humans – Three handshake models face the Turing-like handshake test", *IEEE Transactions on Haptics*
16. Acuna, DE, Schrater, P. (2010) "Structure learning in human sequential decision-making", *PLoS Computational Biology*
17. Acuna, DE, Parada, V. (2010) "People efficiently explore the solution space of the computationally intractable traveling salesman problem to find near-optimal tours", *PLoS ONE* 5(7)

Conference publications

18. Lizhen Liang and Daniel E. Acuna, DE. (2020) "Artificial mental phenomena: Psychophysics as a framework to detect perception biases in AI models". In Conference on Fairness, Accountability, and Transparency (FAT* '20), January 27–30, 2020, Barcelona, Spain. ACM, New York, NY, USA, 10 pages
19. Daniel E. Acuna, (2019) "Helping research misconduct investigations: methods for statistical certainty reporting of inappropriate figure reuse", World Conference on Research Integrity 2019, Hong Kong
20. Zeng, T, Acuna, DE, (2019) Dead science: most resources linked in scientific articles disappear in eight years, iConference 2019 (to appear in Lecture Notes of Computer Science)
21. Sheima, A. Acuna, DE "Show me your app usage and I will tell who your close friends are: Predicting user's context from simple cellphone activity", *CHI 2017 Late-Breaking Work*
22. Acuna, DE, Green, CS, Schrater, P (2010) "The rational control of aspiration in learning", *COSYNE 2010* (Abstract and poster presentation)
23. Acuna, DE, Green, CS, Schrater, P (2010) "Decision-making in unbounded environments using nonparametric Bayesian Reinforcement Learning", *NIPS 2010 Workshop on Bounded-rational analyses of human cognition: Bayesian models, approximate inference, and the brain* (Poster presentation)
24. Acuna, DE, Schrater, P. (2009) "Improving Bayesian reinforcement learning using transition abstraction", *ICML/UAI/CLT Workshop on Abstraction in Reinforcement Learning 2009*
25. Acuna, DE, Parada, V, Schrater, P (2009) "Skill acquisition and performance on the Traveling Salesman Problem", Center for Cognitive Science, Spring Research Day (Poster presentation)
26. Acuna, DE, Schrater P.(2009) "Structure learning in human sequential decision-making", *COSYNE 2009*
27. Acuna, DE, Schrater, P. (2009) "Structure learning in human sequential decision-making", *NIPS 2008*
28. Acuna, DE, Schrater, P. (2008) "Bayesian modeling of human sequential decision-making on the Multi-Armed Bandit Problem", *COGSCI 2008*

Books and book chapters

29. Zeng, T, Acuna, DE, (2020) "Dataset mention extraction in scientific articles using a BiLSTM-CRF model" Chapter 11 in Julia I. Lane, Ian Mulvany, and Paco Nathan (Ed.), Rich Search and Discovery for Research Datasets: Building the next generation of scholarly infrastructure, New York, 2020
30. Acuna, DE, (2011) Rational Bayesian analysis of sequential decision-making under uncertainty in humans and machines, Ph.D. Thesis, University of Minnesota-Twin Cities

Keynote and invited talks

1. June 10, 2019 - Invited talk and panel discussion - Science of bad science, *Science of Science conference at the University of Chicago Center in Beijing, Beijing, China*

2. May 10, 2019 - Keynote speaker - To catch a science cheater: detecting of imagery fraud in biomedical research, *8th Annual Ethics in Biomedical Research Lecture, University of Rochester School of Medicine and Dentistry*
3. March 10, 2019 - Invited talk - The effect of innovation on future impact of scientific grants, *Research Institute of Electrical Communication, Tohoku University*, *Sendai*, *Japan*
4. November, 2018 - Invited talk and panel discussion - Bias in Deep Learning Models - *Journalist & Artificial Intelligence: Consequences and Opportunities in Emerging Tech - Diversity, Inclusion, & Bias in AI, Newhouse, Syracuse University*
5. November, 2017 - Invited Talk - Data Science of Data Science: Should you improve your Hadoop skills or learn time series analytics?, *Computer Science, Syracuse University*
6. October, 2017 - Invited Talk Data Science of Data Science: Should you improve your Hadoop skills or learn time series analytics?, *Rochester Institute of Technology*
7. October, 2016 - Invited talk - Improving Scientific Innovation: A Data Science Perspective, *Research Computing, Syracuse University*
8. May, 2016 - Invited webinar - Evaluating Merit Review: Content-Based Reviewer-Manuscript Assignment and Bayesian Article Scoring, *American Institute of Biological Sciences Scientific, Peer Advisory and Review Services*
9. April, 2016 - Plenary talk - Tools to improve peer review and scholarly research, *University of Wisconsin, Madison*
10. March, 2016 - Lighting talk - Predicting who will agree to review, *International Symposium on Science of Science, Washington, DC*
11. March, 2016 - Plenary talk - Data science to understand knowledge discovery and expertise, *ChiPy (Chicago Python), Chicago, IL*
12. “Should journals allow authors to suggest reviewers?” (talk), Quantifying Science, (European) Conference on Complex Systems ’15, Temple, Arizona, Summer 2015
13. “Machine learning tools for improving Science” (talk), Metaknowledge Research Network, Summer Retreat, California, Summer 2015
14. “Big data science of science” (talk), Metaknowledge Research Network, Spring Retreat, University of Chicago, Winter 2015
15. “Big data science of science” (Invited talk), Science Week 2014, Loyola University, Chicago, October 2014
16. "Automatic detection of figure element reuse in biological science articles", (talk) Science of Team Science Conference, Austin, TX, August 2014
17. "Big data machine learning for prediction and classification" (Invited academic speaker, plenary), The Tenth Workshop on the Development of Advanced Algorithms for Security Applications (ADSA10), Boston, MA, April 2014,
18. “An investigation of how prior beliefs influence decision-making under uncertainty in a 2AFC task”, (Plenary talk, 3% acceptance rate) Computational and Systems Neuroscience (COSYNE), Salk Lake City, UT, March 2013
19. "Rational analysis of human problem solving and sequential decision-making under uncertainty ", (Invited talk) Rehabilitation Institute of Chicago, Northwestern University, Chicago, IL, July 2010
20. "Rational analysis of human sequential decision-making under uncertainty and human problem solving", (Invited talk) Department of Brain and Cognitive Sciences, MIT, Cambridge, MA, June 2010

Patents

1. Daniel E. Acuna, Konrad Kording, "System and method for automated detection of figure element reuse", U.S. Provisional Patent Application, 2020
2. Konrad Kording, Daniel E. Acuna, Titipat Achakulvisut. "Data Butler". U.S. Provisional Patent Application No. 62/218,998, filed September 15, 2015 (assignee Rehabilitation Institution of Chicago)

Academic service

- Organizer of the Science of Science Summer School (S4) 2021, Syracuse University, Syracuse, NY (https://scienceofscience.org/s4)
- Organizer of the Computational Research Integrity Conference (CRICONF) 2021, Washington, DC (https://cri-conf)
- Editorial Board: Journal of Social Computing (new journal)
- Associate Chair: Late-Breaking Work CHI 2017
- Reviewer for: Nature Communications, Scientometrics, Journal of Informetrics, Research Policy, IEEE Transactions on Human-Machine Systems, Journal of the Royal Society Interface, Research Evaluation, Operations Research, PLoS Computational Biology, PLoS ONE, Scientometrics, NIPS 2009, NIPS 2010, CogSci 2009
- Ad-hoc reviewer: NSF's Science of Science and Innovation Policy, Department of Energy Office of Science's Office of Advanced Scientific Computing Research
- Training Committee member of the Center for Cognitive Science, University of Minnesota, organized panel discussion on "Job hunting, hiring process and setting up a new lab in academia"

Media

- Mention of my work in Nature Machine Learning Editorial (2020) "A match for virtual conferences"
- Mention of my work in Nature News (2020) "Publishers launch joint effort to tackle altered images in research papers"
- Interview in Nature Feature (2020) Meet this super-spotter of duplicated images in science papers (about Elisabeth Bik)
- Nature Feature interview about Elisabeth Bik (2020) Meet this super-spotter of duplicated images in science papers
- Nature News (2018) "Researchers have finally created a tool to spot duplicated images across thousands of papers", author: Declan Butler
- Interviews: The Daily Orange (Syracuse University, 2016), Nature Podcast (2012, The Chronicle of Higher Education (2012), NPR Science Friday (Spanish, 2012), The Scientists (2012)
- Articles about my work: Nature Editorial, Wired, Phys.org, BioTechniques, ScienceDaily

Students

Visiting scholar: Tong Zeng, School of Information Management, Nanjing University

Ph.D students: Han Zhuang and Lizhen Liang from iSchool, Syracuse University