

Reese Richardson

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Education

Northwestern University – Evanston, IL **Fall 2019 – Fall 2024**

PhD in Interdisciplinary Biological Sciences (IBiS)

Thesis: *Metascientific studies in reproducibility, bias and fraud*

Biotechnology Training Program (NIGMS T32 GM008449)

North Central College – Naperville, IL **Fall 2015 – Summer 2019**

Bachelor of Science in Applied Mathematics & Bachelor of Arts in Physics

Research Experience

Postdoctoral Fellow – Northwestern University – Evanston, IL **Summer 2025 -- Present**

Center for Science of Science and Innovation

- ❖ Studying the accumulation of scientific and medical evidence before the approval of breakthrough drug candidates

Postdoctoral Fellow – Northwestern University – Evanston, IL **Fall 2024 – Summer 2025**

Laboratory of Dr. Luís Amaral

- ❖ Characterized networks underlying industrialized scientific fraud and developing methods for inferring irreproducibility in the published literature

Graduate Researcher – Northwestern University – Evanston, IL **Fall 2019 – Fall 2024**

Thesis Research in Laboratory of Dr. Luís Amaral

- ❖ Developed methods for identifying and quantifying undocumented biases in RNA-seq pipelines
- ❖ Investigated inequality in research attention to human genes, developed *Find My Understudied Genes*

Volunteer in Laboratory of Dr. Jaline Gerardin

- ❖ Developed COVID-19 epidemiological models for use by Office of the Governor of Illinois and Illinois Department of Public Health

Winter 2020 Rotation in Laboratory of Dr. Guillermo Ameer

- ❖ Engineered and fabricated micro-patterned surfaces on 3D-printable bioresorbable vascular scaffolds

Fall 2019 Rotation in Laboratory of Dr. Luís Amaral

- ❖ Designed, performed, and analyzed simulations to assess biases in popular RNA-seq quantification software packages

Computational Biology Intern – Envisagenics – New York City, NY **Summer 2024**

- ❖ Benchmarked pipelines for reconstruction of alternative splicing events from RNA-seq data

Public Service Intern – Chicago Department of Public Health – Chicago, IL **Fall 2020 – Fall 2022**

- ❖ Developed and executed pipelines for COVID-19 sentinel surveillance from outpatient diagnostic testing and hospital admissions data in Chicago
- ❖ Delivered weekly reports on sentinel surveillance to Director of Epidemiology

Undergraduate Researcher – North Central College – Naperville, IL **Fall 2018 – Spring 2019**

North Central College Richter Grant Recipient

- ❖ Designed study to investigate the formation of complex pores during the electroporation of *E. coli*
- ❖ Developed novel technique of delayed probe delivery to describe lifetime of pore closure after electroporation

Undergraduate Researcher – Northern Illinois University – DeKalb, IL Summer 2017 – Spring 2019

REU Program - NSF-REU Grant CHE-1659548

- ❖ Initiated, completed, and structurally analyzed molecular dynamics simulations of ionic liquid systems in LAMMPS
- ❖ Developed statistical technique of First-Neighbor Analysis to quantify aggregation in simulated systems

Awards & Honors

Outstanding Dissertation Award, IBiS, Northwestern University, 2024

Moderna Global Fellowship, Moderna Inc., 2023 – 2025

CoDEX Best Poster, Northwestern University, 2024

Dr. John N Nicholson Fellowship, Northwestern University, 2022-2023

NIH-NIGMS Biotechnology Training Program (NIGMS T32 GM008449), 2020-2022

Love Data Week Data Visualization Contest 2nd Place Winner, Northwestern University, 2021

Outstanding Contribution to Student Life Award, North Central College, 2019

Making the Invisible Visible Award, Department of Physics & Chemistry, 2018

Changemaker of the Year Award, North Central College, 2018

Member, Pi Mu Epsilon Mathematics Honor Society, 2016-present

Member, Alpha Delta Pi Disability Honor Society, 2016-present

Fermilab Science Award, 2015

National Merit Scholar, 2015

Publications

- ❖ **Richardson, R.A.K.**, Spick, M. *Meeting the challenges posed by mass-produced manuscripts and click-data science*. European Science Editing 51: e165043 (2025). <https://doi.org/10.3897/ese.2025.e165043>
- ❖ **Richardson, R.A.K.**, Hong, S.S., Byrne, J.A., Stoeger, T., Amaral, L.A.N. *The entities enabling scientific fraud at scale are large, resilient, and growing rapidly*. Proceedings of the National Academy of Sciences, 122 (32) e2420092122, (2025). <https://doi.org/10.1073/pnas.2420092122>
- ❖ **Richardson, R.A.K.**, Moon, J., Hong, S.S., Amaral, L.A.N. *Widespread misidentification of scanning electron microscope instruments in the peer-reviewed materials science and engineering literature*. PLOS One (2025). <https://doi.org/10.1371/journal.pone.0326754>
- ❖ **Richardson, R.A.K.** *The Collection of Open Science Integrity Guides: Expanding participation in post-publication peer review*. Under review (2025). <https://doi.org/10.5281/zenodo.15564777>
- ❖ **Richardson, R.A.K.**, Wise, N.H., Hong, S.S., Draper, M.J., Fackrell, S. *Exploitation of intellectual property systems for the manipulation of academic reputations*. International Journal for Educational Integrity, 21, 15 (2025). <https://doi.org/10.1007/s40979-025-00185-8>
- ❖ Oste, D.J., Pathmendra, P., **Richardson, R.A.K.**, Johnson, G., Ao, Y., Arya, M.D., Enochs, N.R., Hussein, M., Kang, J., Lee, A., Danon, J.J., Cabanac, G., Labbé, C., Capes-Davis, A., Stoeger, T.,

Byrne, J.A. *Misspellings or “miscellings”-non-verifiable cell lines in cancer research publications*. International Journal of Cancer, 1-12 (2024). <https://doi.org/10.1002/ijc.34995>

- ❖ **Richardson, R.A.K.**, Tejedor Navarro, H., Amaral, L.A.N., Stoeger, T. *Meta-Research: understudied genes are lost in a leaky pipeline between genome-wide assays and reporting of results*. eLife (2024). <https://doi.org/10.7554/eLife.93429>
- ❖ Toh, K.B., Runge, M., **Richardson, R.A.K.**, Hladish, T.J., Gerardin, J. *Design of effective outpatient sentinel surveillance for COVID-19 decision making: a modeling study*. BMC Infectious Diseases, **23(1)**, 287 (2023). <https://doi.org/10.1186/s12879-023-08261-5>
- ❖ Elasser, S., Elia, L.P., Morimoto, R.I., Powers, E.T., Finley, D., Costa, B., Budron, M., Tokuno, Z., Wang, S., Iyer, R.G., Barth, B., Mockler, E., Finkbeiner, S., Gestwicki, J.E., **Richardson, R.A.K.**, Stoeger, T., Tan, E.P., Xiao, Q., Cole, C.M., Massey, L.A., Garza, D., Kelly, J.W., Rainbolt, T.K., Chou, C., Masto, V.B., Frydman, J., Nixon, R.A. *A Comprehensive Enumeration of the Human Proteostasis Network. 2. Components of the Autophagy-Lysosome Pathway*. bioRxiv 2023.03.22.533675. <https://doi.org/10.1101/2023.03.22.533675>
- ❖ Byrne, J.A., Park, Y., **Richardson, R.A.K.**, Pathmendra, P., Sun, M., Stoeger, T. *Protection of the human gene research literature from contract cheating organizations known as research paper mills*. Nucleic Acids Research, gkac1139 (2022). <https://doi.org/10.1093/nar/gkac1139>
- ❖ **Richardson, R.A.K.**, Jorgensen, E., Arevalo, P., Holden, T.M., Pacilli, M., Ghinai, I., Lightner, S., Cobey, S., Gerardin, J. *Tracking changes in SARS-CoV-2 transmission with a novel outpatient sentinel surveillance system in Chicago, Illinois, USA*. Nature Communications **13**, 5547 (2022). <https://doi.org/10.1038/s41467-022-33317-6>
- ❖ Runge, M., **Richardson, R.A.K.**, Clay, P., Eagan, A., Holden, T.M., Singam, M., Tsuboyama, N., Arevalo, P., Fornoff, J., Patrick, S., Ezike, N.O., Gerardin, J. *Modeling robust COVID-19 intensive care unit occupancy thresholds for imposing mitigation to prevent exceeding capacities*. PLOS Global Public Health **2**, 5 (2022). <https://doi.org/10.1371/journal.pgph.0000308>
- ❖ Xavier, J., Monk, J.M., Poudel, S., Norsigian, C.J., Sastry, A.V., Liao, C., Bento, J., Suchard, M.A., Arrieta-Ortiz, M.L., Peterson, E.J.R., Baliga, N.S., Stoeger, T., Ruffin, F., **Richardson, R.A.K.**, Gao, C.A., Horvath, T.D., Haag, A.M., Yeaman, M.R. *Mathematical models to study the biology of pathogens and the infectious diseases they cause*. iScience, 104079 (2022). <https://doi.org/10.1016/j.isci.2022.104079>
- ❖ Burke, J.A., Zhang, X. Bobbala, S.K.R., Frey, M.A., Bohorquez Fuentes, C., Freire Haddad, H., Allen, S.D., **Richardson, R.A.K.**, Ameer, G.A., Scott, E.A. *Subcutaneous nanotherapy repurposes the immunosuppressive mechanism of rapamycin to enhance allogeneic islet graft viability*. Nature Nanotechnology (2022). <https://doi.org/10.1038/s41565-021-01048-2>
- ❖ Holden, T.M.*, **Richardson, R.A.K.***, Arevalo, P., Duffus, W.A., Runge, M., Whitney, E., Wise, L., Ezike, N.O., Patrick, S., Cobey, S., Gerardin, J. *Geographic and demographic heterogeneity of SARS-CoV-2 diagnostic testing in Illinois, USA, March to December 2020*. BMC Public Health **21**, 1105 (2021). <https://doi.org/10.1186/s12889-021-11177-x>

Presentations

Thieme Group Lunch and Learn – Online

September 2025

“The entities enabling scientific fraud at scale are large, resilient, and growing rapidly”

10th International Congress on Peer Review and Scientific Publication – Chicago

September 2025

“Scale and Resilience in Organizations Enabling Systematic Scientific Fraud”

10th International Congress on Peer Review and Scientific Publication – Chicago	September 2025
<i>"Misidentification of Scanning Electron Microscope Instruments in the Peer-Reviewed Materials Science and Engineering Literature"</i>	
Paper Mill Detect and Correct Group – Online	August 2025
<i>"The entities enabling scientific fraud at scale are large, resilient, and growing rapidly"</i>	
Open Research Summer School – King's College London (Remote)	July 2025
<i>"The Collection of Open Science Integrity Guides"</i>	
STM Research Integrity Committee Meeting – Online	July 2025
<i>"The Collection of Open Science Integrity Guides"</i>	
NICO Data Science Nights – Northwestern University	May 2025
<i>"Using data science to better understand the academic black market"</i>	
Truth in Beauty e-Summit – Online	September 2024
<i>"Research fraud, predatory journals and science integrity"</i>	
Computation and Data Exchange (CoDEX) – Northwestern University	April 2024
<i>"Widespread misidentification of SEM instruments in the peer-reviewed materials science and engineering literature"</i>	
AIMOS Conference 2023 – Brisbane, Australia (Remote)	November 2023
<i>"Journal hopping by research paper mills after a preferred journal is de-indexed"</i>	
IBiS Scientific Retreat – Delavan, Wisconsin	September 2023
<i>"Where there's smoke, there's fire: identifying fraud and paper mill activity in the biomedical literature"</i>	
ICSSI 2023 – Northwestern University	June 2023
<i>"A rationally designed tool to promote the investigation of understudied genes"</i>	
Metascience 2023 – Washington D.C.	May 2023
<i>"Journal hopping by research paper mills after a preferred journal is de-indexed"</i>	
IPHAM Population Health Forum – Northwestern University	December 2022
<i>"Tracking changes in SARS-CoV-2 transmission with a novel outpatient sentinel surveillance system in Chicago, Illinois, USA"</i>	
5th Meeting on Biological Data Science – Cold Spring Harbor, New York	November 2022
<i>"A rationally designed tool to promote the investigation of understudied genes"</i>	
IBiS Scientific Retreat – Delavan, Wisconsin	September 2022
<i>"Temporal evolution of the human gene bibliography"</i>	
Conference on Quantitative Approaches in Biology – Northwestern University	March 2022
<i>"Tracking changes in SARS-CoV-2 transmission with a novel outpatient sentinel surveillance system in Chicago, Illinois, USA"</i>	
International Meeting on Emerging Diseases and Surveillance – Online	November 2021
<i>"Tracking changes in SARS-CoV-2 transmission with a novel outpatient sentinel surveillance system in Chicago, Illinois, USA"</i>	
IBiS Scientific Retreat – Delavan, Wisconsin	September 2021
<i>"What are we missing? Identifying bias in gene expression platforms via meta-analysis"</i>	
National Science Foundation Conference on COVID-19 Modeling – Online	January 2021
<i>"Estimating incident SARS-CoV-2 infection detection rates with mortality data"</i>	
Biology/Chemistry Seminar – North Central College	April 2019

"Fluorescence Methods for Quantifying Porosity and Lifetimes of Pore Closure during Electroporation of Escherichia Coli"

Biophysical Society Annual Conference – Baltimore, Maryland

February 2019

"Fluorescence Methods for Quantifying Porosity and Lifetimes of Pore Closure during Electroporation of Escherichia Coli"

Rall Symposium for Undergraduate Research – North Central College

May 2018

"Long-Range Ordering in 1-Methyl-1-alkylpyrrolidinium Bis(trifluoromethylsulfonyl)imide Ionic Liquids"

National Conference on Undergraduate Research – University of Central Oklahoma

April 2018

"Long-Range Ordering in 1-Methyl-1-alkylpyrrolidinium Bis(trifluoromethylsulfonyl)imide Ionic Liquids"

National Science Foundation REU Conference – Alexandria, Virginia

October 2017

"Long-Range Ordering in 1-Methyl-1-alkylpyrrolidinium Bis(trifluoromethylsulfonyl)imide Ionic Liquids"

Technical Skills

Programming Languages: Python, R, STAN, MATLAB, Bash, C++, Java, LabView, LaTeX, Tcl-tk

Operating Systems: UNIX, Windows, Macintosh

Programs: Keras, Pytorch, Git, Slurm, TORQUE, LAMMPS, Fusion 360, OpenSCAD

Other: Machine learning, natural language processing, text and data mining, FDM and SLA additive manufacturing, hobbyist robotics and micro-computing

Service & Teaching

Maintainer -- The Collection of Open Science Integrity Guides

Spring 2025 – Present

- ❖ Launched and grew open-source handbook for post-publication peer review, currently features 31 guides (cosig.net)

Teaching Assistant – IBIS 402 – Eukaryotic Molecular Biology

Fall 2022

- ❖ Assisted with instruction of 7 graduate students

Teaching Assistant – BIOL_SCI 378 – Functional Genomics

Winter 2022

- ❖ Wrote course content and instructed 36 undergraduate students ([GitHub](https://github.com))

Teaching Assistant – BIOL_SCI 221 – Molecular and Cellular Processes Laboratory

Winter 2021

- ❖ Instructed 54 undergraduate students remotely in cell biology laboratory course

Assistant Speech Coach – DG South High School – Downers Grove, IL

Winter 2017 – Spring 2019

- ❖ Provided coaching and mentorship for 60+ high school speech competitors

President – Students for Social Innovation – North Central College

Fall 2016 – Spring 2019

- ❖ Founded and led unique student congress for social change

Competitor – Speech and Debate Team – North Central College

Fall 2015 – Spring 2018

- ❖ Developed excellent communication skills through seven years in high school and collegiate speech and debate, competing at state and national level

Advanced Laboratory Assistant – North Central College – Naperville, IL

Fall 2017

- ❖ Built and calibrated apparatus demonstrating single-photon interference to be used in upper-level quantum physics courses

Laboratory Teaching Assistant – North Central College – Naperville, IL

Winter 2017 – Spring 2017

Courses Taught: Physics II, Physics III, Physics of Music

- ❖ Worked alongside professor to guide introductory physics students through laboratory coursework