

# Reese Richardson

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## Education

### Northwestern University – Evanston, IL

Fall 2019 – Present

Pursuing PhD in Interdisciplinary Biological Sciences (IBiS) Program

Thesis: *Identifying bias and improving reproducibility in RNA-seq computational pipelines*

Biotechnology Training Program (NIGMS T32 GM008449)

GPA: 4.00/4.00

### North Central College – Naperville, IL

Graduation: June 2019

Bachelor of Science in Physics & Applied Mathematics

GPA: 3.46/4.00

## Research Experience

### Public Service Intern – Chicago Department of Public Health – Chicago, IL

Fall 2020 – Present

- ❖ 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

### Graduate Researcher – Northwestern University – Evanston, IL

Fall 2019 – Present

Thesis Research in Laboratory of Dr. Luis Amaral

- ❖ Developing methods for identifying and quantifying undocumented biases in RNA-seq pipelines

Spring 2020 Rotation 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. Luis Amaral

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

### 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

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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 2<sup>nd</sup> 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

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- ❖ **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*. Under review (2022).  
[www.medrxiv.org/content/10.1101/2022.05.10.22274869v1](http://www.medrxiv.org/content/10.1101/2022.05.10.22274869v1)
- ❖ 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). [doi.org/10.1371/journal.pgph.0000308](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).  
[doi.org/10.1016/j.isci.2022.104079](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). [doi.org/10.1038/s41565-021-01048-2](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). [doi.org/10.1186/s12889-021-11177-x](https://doi.org/10.1186/s12889-021-11177-x)

## Presentations

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|---|-----------------------|
| <b>Conference on Quantitative Approaches in Biology – Northwestern University</b>   | <b>March 2022</b>     |
| <i>“Tracking changes in SARS-CoV-2 transmission with a novel outpatient sentinel surveillance system in Chicago, Illinois, USA”</i> |                       |
| <b>International Meeting on Emerging Diseases and Surveillance – Online</b>   | <b>November 2021</b>  |
| <i>“Tracking changes in SARS-CoV-2 transmission with a novel outpatient sentinel surveillance system in Chicago, Illinois, USA”</i> |                       |
| <b>IBiS Scientific Retreat – Delavan, Wisconsin</b>   | <b>September 2021</b> |
| <i>“What are we missing? Identifying bias in gene expression platforms via meta-analysis”</i>                                       |                       |

<b>National Science Foundation Conference on COVID-19 Modeling – Online</b>	<b>January 2021</b>
<i>“Estimating incident SARS-CoV-2 infection detection rates with mortality data”</i>	
<b>Biology/Chemistry Seminar – North Central College</b>	<b>April 2019</b>
<i>“Fluorescence Methods for Quantifying Porosity and Lifetimes of Pore Closure during Electroporation of Escherichia Coli”</i>	
<b>Biophysical Society Annual Conference – Baltimore, Maryland</b>	<b>February 2019</b>
<i>“Fluorescence Methods for Quantifying Porosity and Lifetimes of Pore Closure during Electroporation of Escherichia Coli”</i>	
<b>Rall Symposium for Undergraduate Research – North Central College</b>	<b>May 2018</b>
<i>“Long-Range Ordering in 1-Methyl-1-alkylpyrrolidinium Bis(trifluoromethylsulfonyl)imide Ionic Liquids”</i>	
<b>National Conference on Undergraduate Research – University of Central Oklahoma</b>	<b>April 2018</b>
<i>“Long-Range Ordering in 1-Methyl-1-alkylpyrrolidinium Bis(trifluoromethylsulfonyl)imide Ionic Liquids”</i>	
<b>National Science Foundation REU Conference – Alexandria, Virginia</b>	<b>October 2017</b>
<i>“Long-Range Ordering in 1-Methyl-1-alkylpyrrolidinium Bis(trifluoromethylsulfonyl)imide Ionic Liquids”</i>	

## Technical Skills

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Programming Languages: Python, R, MATLAB, Bash, C++, Java, LabView, LaTeX, Tcl-tk  
Operating Systems: UNIX, Windows, Macintosh  
Programs: Slurm, TORQUE, LAMMPS, VMD, PyMOL, Mathematica, Fusion 360, OpenSCAD  
Other: FDM and SLA additive manufacturing, hobbyist robotics and micro-computing

## Service

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<b>Assistant Speech Coach – DG South High School – Downers Grove, IL</b>	<b>Winter 2017 – Spring 2019</b>
❖ Provided coaching and mentorship for 60+ high school speech competitors	
<b>President – Students for Social Innovation – North Central College</b>	<b>Fall 2016 – Spring 2019</b>
❖ Founded and led unique student congress for social change	
<b>Competitor – Speech and Debate Team – North Central College</b>	<b>Fall 2015 – Spring 2018</b>
❖ Developed excellent communication skills through seven years in high school and collegiate speech and debate, competing at state and national level	
<b>Advanced Laboratory Assistant – North Central College – Naperville, IL</b>	<b>Fall 2017</b>
❖ Built and calibrated apparatus demonstrating single-photon interference to be used in upper-level quantum physics courses	
<b>Laboratory Teaching Assistant – North Central College – Naperville, IL</b>	<b>Winter 2017 – Spring 2017</b>
Courses Taught: Physics II, Physics III, Physics of Music	
❖ Worked alongside professor to guide introductory physics students through laboratory coursework	