

Andrew C. Patt

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Education

- **The Ohio State University** **Expected Graduation: March 2021**
PhD in Biomedical Science, concentration in Biomedical Informatics, GPA: 3.813/4.0 Columbus, OH
- **State University of New York at Geneseo** **May 2015**
B.Sc. in Biochemistry, minor in Biomathematics, GPA: 3.660/4.0 Geneseo, NY

Awards

- **Finalist, Ruth L. Kirschstein National Research Service Award (NRSA) Individual Predoctoral Fellowship** 2020
Received a potentially fundable score of 30 applying for NLM F31 fellowship, ultimately not funded
- **Systems and Integrative Biology Training Program Fellow** 2017-2019
Competitive departmental T32 fellowship offered through Biomedical Sciences Graduate Program at Ohio State
- **American Society of Mass Spectrometry Travel Award** 2018 and 2019
Travel stipend for student attendees of American Society of Mass Spectrometry annual conference
- **May Institute Travel Award** 2018
Travel stipend for attendees of Northeastern University May Institute of mass spectrometry
- **Multi-Modeling and Integrative Data Analytics Training Program fellow** 2016-2017
Departmental T15 fellowship offered through Biomedical informatics department at Ohio State
- **Best Poster Award** 2016
Awarded during NIAMS Scientific Planning Retreat
- **Summer Undergraduate Research Fellowship at University at Buffalo** 2014
Funded by American Society for Pharmacology and Experimental Therapeutics

Publications

1. **Patt, A.**; Demoret, B.; Stets, C.; Bill, K.-L.; Smith, P.; Vijay, A.; Patterson, A.; Hays, J.; Hoang, M.; Chen, J.L.; Mathé, E.A. *MDM2-Dependent Rewiring of Metabolomic and Lipidomic Profiles in Dedifferentiated Liposarcoma Models*. *Cancers* 2020, 12, 2157.
2. *An OpenData portal to share COVID-19 drug repurposing data in real time*. Kyle R. Brimacombe, Tongan Zhao, Richard T. Eastman, Xin Hu, Ke Wang, Mark Backus, Bolormaa Baljinnyam, Catherine Z. Chen, Lu Chen, Tara Eicher, Marc Ferrer, Ying Fu, Kirill Gorshkov, Hui Guo, Quinlin M. Hanson, Zina Itkin, Stephen C. Kales, Carleen Klumpp-Thomas, Emily M. Lee, Sam Michael, Tim Mierzwa, **Andrew Patt**, Manisha Pradhan, Alex Renn, Paul Shinn, Jonathan H. Shrimp, Amit Viraktamath, Kelli M. Wilson, Miao Xu, Alexey V. Zakharov, Wei Zhu, Wei Zheng, Anton Simeonov, Ewy A. Mathé, Donald C. Lo, Matthew D. Hall, Min Shen. *bioRxiv* 2020.06.04.135046; doi: <https://doi.org/10.1101/2020.06.04.135046>
3. Eicher, T.; Kinnebrew, G.; **Patt, A.**; Spencer, K.; Ying, K.; Ma, Q.; Machiraju, R.; Mathe, E.A. *Metabolomics and Multi-Omics Integration: A Survey of Computational Methods and Resources*. *Metabolites* 2020, 5, 15.
4. **Patt, A.**; Eicher, T.; Kautto, E.; Machiraju, R.; Mathe, E.A.; Zhang, Y. *Challenges in proteogenomics: a comparison of analysis methods with the case study of the DREAM Proteogenomics Sub-Challenge*. *BMC Bioinformatics* 2019;20(Suppl 24):669.
5. Zhang, B.; Hu, S.; Baskin, E.; **Patt, A.**; Siddiqui, J.K.; Mathe, E.A. *RaMP: A Comprehensive Relational Database of Metabolomics Pathways for Pathway Enrichment Analysis of Genes and Metabolites*. *Metabolites* 2018, 8, 16.
6. **Patt A.**; Siddiqui J.; Zhang B.; Mathe E.A. (2019) *Integration of Metabolomics and Transcriptomics to Identify Gene-Metabolite Relationships Specific to Phenotype*. In: Haznadar M. (eds) *Cancer Metabolism*. *Methods in Molecular Biology*, vol 1928. Humana Press, New York, NY

Presentations

- **Metabolomics Society Annual Meeting** **November 2020**
Poster Online
Improving pathway analysis of lipidomic and metabolomic data through comprehensive functional annotation and network approaches

<ul style="list-style-type: none"> Metabolomics Association of North America Annual Meeting 15 minute talk Improving pathway analysis of lipidomic and metabolomic data through comprehensive functional annotation and network approaches 	September 2020 Ann Arbor, MI (virtual)
<ul style="list-style-type: none"> American Society for Mass Spectrometry Poster MDM2 copy number aberrations alter ceramide glycosylation in liposarcoma tumors, impacting drug response 	June 2020 Houston, TX (virtual)
<ul style="list-style-type: none"> Wexner Medical Center Trainee Research Day Poster MDM2 copy number aberrations alter ceramide glycosylation in liposarcoma tumors, impacting drug response 	April 2020 Columbus, OH
<ul style="list-style-type: none"> Ohio Mass Spectrometry and Metabolomics Symposium Poster MDM2 copy number aberrations alter ceramide glycosylation in liposarcoma tumors, impacting drug response 	October 2019 Columbus, OH
<ul style="list-style-type: none"> International Conference on Intelligent Biology and Medicine 20 minute talk Challenges in proteogenomics: a comparison of analysis methods with the case study of the DREAM Proteogenomics Sub-Challenge 	June 2019 Columbus, OH
<ul style="list-style-type: none"> American Society for Mass Spectrometry Poster MDM2 Alterations Reprogram the Metabolic Functioning of Liposarcoma Cell Lines 	June 2019 Atlanta, GA
<ul style="list-style-type: none"> Ohio State University Cancer Care Center Annual Meeting Poster MDM2 Alterations Reprogram the Metabolic Functioning of Liposarcoma Cell Lines 	May 2019 Columbus, OH
<ul style="list-style-type: none"> American Society for Mass Spectrometry Poster MDM2 alterations reprogram the metabolic functioning of liposarcoma cell lines 	June 2018 San Diego, CA
<ul style="list-style-type: none"> Ohio Mass Spectrometry and Metabolomics Symposium Poster MDM2 Alterations Reprogram the Metabolic Functioning of Liposarcoma Cell Lines 	April 2018 Columbus, OH
<ul style="list-style-type: none"> National Library of Medicine Informatics Training Conference 5-minute talk MDM2 alterations reprogram the metabolic functioning of liposarcoma cell lines 	June 2017 La Jolla, CA
<ul style="list-style-type: none"> Wexner Medical Center Trainee Research Day Poster MDM2 alterations reprogram the metabolic functioning of liposarcoma cell lines 	April 2017 Columbus, OH
<ul style="list-style-type: none"> NIAMS Scientific Planning Retreat Poster Deep Resequencing of Juvenile Arthritis Patients Identifies Rare Variant Associations 	April 2016 Bethesda, MD
<ul style="list-style-type: none"> Postbac Poster Day Poster Deep Resequencing of Juvenile Arthritis Patients Identifies Rare Variant Associations 	April 2016 Bethesda, MD
<ul style="list-style-type: none"> SUNY Geneseo GREAT Day Poster Sex Differences in MCT1 Tissue Expression 	April 2015 Geneseo, NY
<ul style="list-style-type: none"> University at Buffalo Summer Research Symposium 20 minute talk and poster Sex Differences in MCT1 Tissue Expression 	August 2014 Buffalo, NY

Research Experience

<ul style="list-style-type: none"> National Center for Advancing Translational Sciences Research Associate Working with Dr. Ewy Mathe in the Bioinformatics core at the National Center for Advancing Translational Sciences. Contracted through Axle Informatics. <ul style="list-style-type: none"> Continued projects from OSU including providing guidance for updates of RaMP database/R package. Developing a method for improved functional enrichment analysis of metabolomic data (including pathway analysis) using biological pathway and chemical structure knowledge graphs. Contributing to identifying new, publicly available 'omics data generated in the study of COVID-19. See data portal: https://opendata.ncats.nih.gov/covid19/omics 	March 2020-Present Rockville, MD (remote position)
<ul style="list-style-type: none"> The Ohio State University, Biomedical Informatics Department Graduate Research Assistant 	August 2016-Present Columbus, OH

Working with Dr. Ewy Mathe in the Biomedical Informatics department through the Biomedical Sciences Graduate Program.

- Investigating metabolomic and transcriptomic differences between dedifferentiated liposarcoma tumors based on copy number of the MDM2 oncogene.
- Assisted in developing RaMP metabolic pathways database/R package and Rshiny app.
- Worked primarily with the R programming language as well as Bash, MySQL and Python.
- Ran memory-intensive scripts on the Ohio Supercomputing Cluster.

National Institute of Arthritis, Musculoskeletal and Skin Diseases

July 2015-July 2016

Postbaccalaureate Fellow

Bethesda, MD

Worked in the lab of Dr. Michael Ombrello through NIH postbaccalaureate program.

- Searched for ultrarare genetic variants associated with Systemic Juvenile Idiopathic Arthritis in a targeted resequencing project.
- Used Illumina sequencing kits as well as GATK and annovar softwares.
- Worked with R, Excel and Bash for data sorting, manipulation and analysis.
- Gained experience working with supercomputing clusters.

University at Buffalo, Pharmaceutical Sciences Department

May 2014-August 2014

Summer Undergraduate Research Fellow

Buffalo, NY

Summer undergraduate research fellowship funded by the American Society of Pharmacology and Experimental Therapeutics. Worked with Dr. Marilyn Morris and Dr. Melanie Felmlee in the Pharmaceutical Science department at University at Buffalo.

- Performed RNA extraction/qPCR using rat tissue
- Received weekly coaching on oral/poster presentations of research
- Discovered a significantly lower level of monocarboxylate transporter expression in the livers of female rats per gram of tissue, potentially leading to differences in metabolism of monocarboxylate compounds.

State University of New York at Geneseo, Biology Department

September 2013-May 2015

Undergraduate Research Assistant

Geneseo, NY

- Worked in the Biomathematics research interest group of Dr. Gregg Hartvigsen, learning basic biological network modeling in the R programming language.
- Worked with Dr. Isidro Bosch identifying species of starfish larvae samples using targeted sequencing.

Work Experience

Pace Analytical

June 2013-January 2014

Lab Assistant

Schenectady, NY

- Organized/analyzed chemical and supply purchasing data
- Organized stock room
- Performed sample delivery
- General lab support

Pace Analytical

January 2013-May 2013

Assistant Lab Instructor

Geneseo, NY

Instructed single-semester human biology lab, aided students with experiments and lab reports.

Aqueduct Rowing Club

May 2012-August 2012

Adult Learn-to-Row Coach

Schenectady, NY

Coached two 5-week sessions of an introductory rowing course. Required to devise and execute practice routines to instruct novice adult sweep rowers.

Volunteering and Leadership

Friday Afternoon Bioinformatics Workshops

January 2019-June 2019

Organizer

Columbus, Ohio

Organized and presented at a series of seminars that provided overviews of useful software tools for bioinformaticians, including Git, Bash, Docker, Tidyverse, Emacs and mzMine

Locust Grove Nature Center

August 2015-November 2015

Nature Center Greeter

Bethesda, MD

Helped orient visitors, aided in park events, tracked park usage and maintained trail and visitor center on weekends.

Wadeable Assessment by Volunteer Evaluation Program

May 2012-August 2012

WAVE Volunteer

Albany, NY

Collected samples of Benthic Macroinvertebrates and performed an amateur assessment of stream health from various wadeable stream habitats to aid in a large scale evaluation of freshwater ecosystems health in upstate New York.

Relevant Coursework

Graduate

Northeastern May Institute

May 2018

- Computation and Statistics for Mass Spectrometry and Proteomics (week-long workshop)

The Ohio State University

August 2016-October 2018

- Introduction to Biomedical Informatics
- Analysis and Applications of Genome-Scale Data
- Seminars in Bioinformatics
- Data Structures and Algorithms
- Probability for statistical inference
- Metabolomics, Principles and Practice (audited)

Foundation for Advanced Education in the Sciences

September 2015-May 2016

- Practical Bioinformatics
- Introduction to Python

Undergraduate.....

State University of New York at Geneseo

September 2011-May 2015

- Lab: Biochemistry, Molecular Techniques, Organic Chemistry, Biology, Plant Physiology, Analytical Physics
- Biology: Microbiology, Cell Biology, Genetics, Ecology
- Chemistry: Organic Chemistry, Biochemistry, Physical Chemistry
- Math/Physics: Calculus 1,2,3, Linear Algebra, Probability, Differential Equations, Biostatistics, Modeling Biological Systems, Analytical Physics

Relevant Skills

- **Programming Languages:** R, Python, Bash, MySQL
- **Mass Spec Data Analysis:** mzMine, XCMS, LipidMatch, Metaboanalyst, RaMP, MS-DIAL, Excel
- **Genomic Data Analysis:** Picard, GATK, Annovar
- **Wet Lab:** RNA extraction and purification (Qiagen), Illumina MiSeq library preparation (Nextera Rapid Capture Custom Enrichment kits)
- **Development Tools:** Emacs, Linux, RStudio, Git/Github/Gitlab, RShiny, RMarkdown, Tidyverse, Devtools
- **Public Speaking:** Throughout my undergraduate and graduate careers I have given a large number of oral presentations describing my work, from small group settings to major international conferences.
- **Technical Writing:** I have been the primary author/coauthor on three peer-reviewed manuscripts, as well as secondary author on three more. I have also been the primary submitter on several grant proposals, including a proposal for a departmental T32 award which funded two years of my tuition/stipend at OSU, and an F31 proposal which recieved a potentially fundable score of 30.

Society Memberships

- **Metabolomics Society:** 2020-Present
- **Metabolomics Association of North America:** 2020-Present
- **American Society for Mass Spectrometry:** 2018-Present