ALEXANDRE AMLIE-WOLF, BA

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EDUCATION

University of Pennsylvania, Philadelphia, Pennsylvania, USA. *2013-May 2019*
Ph.D. Genomics and Computational Biology, GPA: 3.86
Thesis Advisor: Li-San Wang

Oberlin College, Oberlin, Ohio, USA. *2009-2013*
B.A. Computer Science with High Honors and B.A. Neuroscience, Phi Beta Kappa
GPA: Computer Science 3.93, Neuroscience 3.7, Cumulative 3.8
Thesis: "A Swarm of Salesmen: Algorithmic Approaches to Multiagent Modeling"
http://rave.ohiolink.edu/etdc/view?acc_num=oberlin1368052652
Thesis Advisor: Tom Wexler

RESEARCH EXPERIENCE

Graduate Student August 2013-Present
Genomics and Computational Biology, University of Pennsylvania *Philadelphia, PA*

- My PhD thesis research involved integrative computational and experimental approaches for characterizing the regulatory mechanisms underlying noncoding genetic variation
- Gained leadership experience by mentoring undergraduate students, training a laboratory technician, and organizing a successful journal club for the Penn Neurodegeneration Genomics Center
- Lead development of open source INFERNO method for integrating hundreds of functional genomics datasets to INFER the molecular mechanisms of NOncoding genetic variants, with web server: http://inferno.lisanwanglab.org
- Implemented HIPPIE2 pipeline for Hi-C data analysis, from raw reads to high-resolution interacting sites and functional annotation
- Applied INFERNO to Alzheimer's Disease GWAS signals where I uncovered novel lncRNA-mediated regulatory mechanisms and performed luciferase validation of enhancer activity
- Applied INFERNO to a variety of other GWAS data: neurodegenerative diseases (Parkinson's, PSP, ALS, CBD, FTD), psychiatric traits (schizophrenia, ADHD), other diseases (IBD, MS), and 2,419 UK Biobank phenotypes
- Throughout my thesis work, I gained experience in analyzing many types of genomics data including RNA-seq, ChIP-seq, DNA-seq, ATAC-seq, and Hi-C
- My collaborative nature also led to joint efforts on many projects both inside and outside of my thesis lab, spanning many fields including computational biology, neuroscience (with Jerry Schellenberg, Virginia Lee, John Trojanowski, Eddie Lee), (epi)genetics (with Shelley Berger), and health economics (with Zeke Emanuel)

Computer Science Honors Student Fall 2012-Spring 2013
Department of Computer Science, Oberlin College *Oberlin, OH*

- Investigated algorithmic approaches to the traveling salesman problem in the context of multiagent optimization

DAAD RISE Scholar Summer 2012
Department of Computer Science, Humboldt-Universität zu Berlin *Berlin, Germany*

- Competitive scholarship ($\sim$ 18%), investigated improving distributed network routing algorithms

Research Assistant Spring 2011-Spring 2013
Department of Neuroscience, Oberlin College *Oberlin, OH*

- Quantitative studies of the neural correlates of decision making using EEG techniques

Research Assistant Fall 2011-Spring 2012
Department of Neuroscience, Oberlin College *Oberlin, OH*

- Evolved artificial neural network-controlled agents to perform minimally cognitive tasks in simulation

Summer Undergraduate Research Assistant Summer 2011
Center for Neurodegenerative Disease Research, University of Pennsylvania *Philadelphia, PA*

- Computational analysis of RNA-sequencing data from a mouse model of amyotrophic lateral sclerosis

Summer Undergraduate Research Assistant Summer 2010
Center for Neurodegenerative Disease Research, University of Pennsylvania *Philadelphia, PA*

- Investigated the role of tau protein fibrillization in Alzheimer's disease in cell culture

SKILLS

Programming languages:
Strong - R (tidyverse), Python, bash, Java, C/C++, LaTeX
Moderate - Mathematica, Assembly, Perl, MATLAB, Scheme, Spark
Computational skills:
Data mining and visualization, machine learning, integrative computational biology and bioinformatics
Wet lab skills:
Molecular cloning, cell culture, transient transfection, luciferase assay, protein biochemistry
Languages:
English: native. French: conversational.

PUBLICATIONS

*: co-first author

Manuscripts in preparation

1. **Amlie-Wolf A***, Wang W*, ..., Wang LS, Schellenberg GD. Progressive supranuclear palsy and genomic features of the chromosome 17 MAPT region.
2. Kuksa P*, **Amlie-Wolf A***, Hwang YC*, Gregory BD, Wang LS. Identifying the transcription factors mediating enhancer - target gene regulation in the human genome.

Manuscripts under review

1. **Amlie-Wolf A***, Tang M*, Way J, Dombroski B, Jiang M, Vrettos N, Chou YF, Zhao Y, Kuzma A, Mlynarski EE, Brown CD, Wang LS, Schellenberg GD (2018). Inferring the molecular mechanisms of noncoding Alzheimer's disease-associated genetic variants. bioRxiv, doi: 10.1101/401471. `https://www.biorxiv.org/content/early/2018/08/27/401471` (Under revision at Molecular Neurodegeneration)
2. Kunkle BW, Grenier-Boley B, Sims R, Bis JC, Naj AC, Boland A, Vronskaya M, Lee SJ van der, **Amlie-Wolf A**, Bellenguez C, ..., Schellenberg GD, Lambert JC, Pericak-Vance MA (2018) Meta-analysis of genetic association with diagnosed Alzheimers disease identifies novel risk loci and implicates Abeta, Tau, immunity and lipid processing. bioRxiv, doi: 10.1101/294629. `https://www.biorxiv.org/content/early/2018/04/05/294629`. (Accepted at Nature Genetics)
3. Wheeler JM*, McMillan P*, Strovas JT*, Liachko NF, **Amlie-Wolf A**, ..., Schellenberg GD, Kraemer B (2018) The poly(A) binding protein MSUT2 controls resistance to both pathological tau and gliosis. (Accepted at Science Translational Medicine)
4. Liu EY, Russ J, Cali CP, Phan JM, **Amlie-Wolf A**, Lee EB (2018). Loss of Nuclear TDP-43 Is Associated with Decondensation of LINE Retrotransposons. (Under revision at Cell Reports)

Journal Articles

1. Kuksa PP, **Amlie-Wolf A**, Katanic Z, Valladares O, Wang LS, and Leung YY (2018). DASHR 2.0: integrated database of human small non-coding RNA genes and mature products. Bioinformatics. doi: 10.1093/bioinformatics/bty709
2. **Amlie-Wolf A**, Tang M, Mlynarski EE, Kuksa PK, Valladares O, Katanic Z, Tsuang D, Brown CD, Schellenberg GD, Wang LS. (2018) INFERNO: INFERring the molecular mechanisms of NOncoding genetic variants. Nucleic Acids Research, doi: 10.1093/nar/gky686

3. Kuksa PP, **Amlie-Wolf A**, Katanic Z, Valladares O, Wang LS. and Leung YY (2018) SPAR: small RNA-seq portal for analysis of sequencing experiments. Nucleic Acids Research, 46, W36W42. doi: 10.1093/nar/gky330
4. Nativio R, Donahue G, Berson A, Lan Y, **Amlie-Wolf A**, Tuzer F , Toledo J , Gosai S, Gregory B, Torres C, Trojanowski J , Wang LS, Johnson FB, Bonini N, Berger S. (2018) Dysregulation of the epigenetic landscape of normal aging in Alzheimer's disease. Nature Neuroscience. doi: 10.1038/s41593-018-0101-9
5. Leung YY, Kuksa P, **Amlie-Wolf A**, Valladares O, Ungar L, Kannan S, Gregory B, Wang LS. (2016) DASHR: database of small human noncoding RNAs. Nucleic Acids Research. doi: 10.1093/nar/gkv1188
6. **Amlie-Wolf A**, Ryvkin P, Tong R, Dragomir I, Suh E, Van Deerlin VM, Gregory BD, Kwong LK, Trojanowski JQ, Lee VM, Wang LS, Lee EB. (2015) Transcriptomic Changes Due to Cytoplasmic TDP-43 Expression Reveal Dysregulation of Histone Transcripts and Nuclear Chromatin. PLoS ONE 10(10): e0141836. doi: 10.1371/journal.pone.0141836

Published Conference Abstracts

1. **Amlie-Wolf A**, Tang M, Way J, Dombroski BA, Vrettos N, Chou YF, Mlynarski EE, Brown CD, Wang LS, Schellenberg GD. (2018) Inferring the Molecular Mechanisms of Noncoding AD-Associated Genetic Variants. Alzheimer's & Dementia: The Journal of the Alzheimer's Association.
2. **Amlie-Wolf A**, Tang M, King J, Dombroski BA, Wang LS, Schellenberg GD. (2016) Computational identification of regulatory mechanisms affected by noncoding variants associated with late-onset Alzheimer's disease. Alzheimer's & Dementia: The Journal of the Alzheimer's Association 12(7), P640-P641.

PRESENTATIONS

Invited and Conference Talks

1. **International Conference on Alzheimer's and Parkinson's Diseases** 03/30/2019
   (AD/PD) Oral Presentation *Lisbon, Portugal*

   Inferring the shared noncoding regulatory mechanisms underlying genetic susceptibility to Alzheimer's and Parkinson's diseases

2. **American Society of Human Genetics** 10/20/2018
   Conference Platform Talk *San Diego, CA*

   Inferring enhancer and noncoding RNA dysregulation underlying 2,419 UK Biobank Phenotypes

3. **Alzheimer's Disease Genetics Consortium** 01/30/2018
   Consortium meeting presentation *University of Pennsylvania*

   Using INFERNO to characterize the effects of noncoding AD variants

4. **Genomics and Computational Biology Retreat** 06/08/2017
   Graduate program retreat presentation *University of Pennsylvania*

   Integrative analysis identifies immune-related enhancers and lncRNAs perturbed by genetic variants associated with Alzheimers disease

5. **Alzheimer's Disease Genetics Consortium** 02/16/2017
   Consortium meeting presentation *Case Western Reserve University*

   Integrative functional analysis identifies enhancers and lncRNAs perturbed by LOAD-associated genetic variants

Refereed Conference Posters

1. Kuksa PP, **Amlie-Wolf A**, Hwang YC, Gregory BD, Wang LS. (2018) HIPPIE2: Hi-C-based landscape of physically interacting regions and interaction mechanisms. The 68th Annual Meeting of the American Society of Human Genetics, Oct 16-20, San Diego, California.
2. Mlynarski EE, **Amlie-Wolf A**, Kuksa PP, Valladares O, Schellenberg GD, Wang LS. (2018) SV-INFERNO: a Spark based pipeline for INFERring the molecular mechanisms of NOncoding structural variants. The 68th Annual Meeting of the American Society of Human Genetics, Oct 16-20, San Diego, California.

3. **Amlie-Wolf A**, Tang M, Way J, Dombroski BA, Vrettos N, Chou YF, Mlynarski EE, Brown CD, Wang LS, Schellenberg GD. (2018) Inferring the Molecular Mechanisms of Noncoding AD-Associated Genetic Variants. Alzheimer's Association International Conference, July 20-26, Chicago, Illinois.
4. **Amlie-Wolf A**, Qu L, Mlynarski EE, Brown CD, Schellenberg DG, Wang LS. (2017) The regulatory landscape of genetic variants associated with psychiatric disorders and neurodegenerative diseases. The 67th Annual Meeting of the American Society of Human Genetics, Oct 17-21, Orlando, Florida.
5. Kuksa PP, Leung YY, **Amlie-Wolf A**, Valladares O, Wang LS. (2017) DASHR 2.0 - database of small non-coding RNAs in normal human tissues and cell types. The 67th Annual Meeting of the American Society of Human Genetics, Oct 17-21, Orlando, Florida.
6. Leung YY, Kuksa PP, **Amlie-Wolf A**, Wang LS. (2017) The landscape of short RNAs in human cell types and tissues. The 67th Annual Meeting of the American Society of Human Genetics, Oct 17-21, Orlando, Florida.
7. **Amlie-Wolf A**, Tang M, King J, Dombroski BA, Chou YF, Mlynarski EE, Schellenberg DG, Wang LS. (2017) Integrative analysis identifies immune-related enhancers and lncRNAs perturbed by genetic variants associated with Alzheimer's disease. UPenn Institute on Aging Retreat, May 23, Philadelphia, Pennsylvania.
8. **Amlie-Wolf A**, Tang M, Kuksa PP, Leung YY, Slaff B, King J, Dombroski BA, Schellenberg DG, Wang LS. (2016) INFERNO - INFERring the molecular mechanisms of NOncoding genetic variants. The 66th Annual Meeting of the American Society of Human Genetics, Oct 18-22, Vancouver, Canada and MidAtlantic Bioinformatics Conference, Oct 26, Philadelphia, PA, USA.
9. Leung YY, Kuksa PP, **Amlie-Wolf A**, Wang LS. (2016) The landscape of regulatory post-transcriptionally derived small noncoding RNAs in the human transcriptome. The 66th Annual Meeting of the American Society of Human Genetics, Oct 18-22, Vancouver, Canada.
10. **Amlie-Wolf A**, Tang M, King J, Dombroski BA, Wang LS, Schellenberg GD. (2016) Computational identification of regulatory mechanisms affected by noncoding variants associated with late-onset Alzheimer's disease. Alzheimer's Association International Conference, July 24-28, Toronto, Canada.
11. Kuksa PP, Leung YY, **Amlie-Wolf A**, Gregory BD, Wang LS. (2015) SPAR - Sequencing-based pipeline for annotating novel small non-coding RNAs. The 65th Annual Meeting of the American Society of Human Genetics, Oct 6-10, Baltimore, Maryland.
12. Leung YY, Kuksa PP, **Amlie-Wolf A**, Gregory BD, Wang LS. (2015) DASHR - Database of small human noncoding RNA. The 65th Annual Meeting of the American Society of Human Genetics, Oct 6-10, Baltimore, Maryland.
13. Freedman J, **Amlie-Wolf A**, Wittenberg R, Shoham O, Aronson S, Loose MD. (2014) Identifying the relative influence of multiple prior events on predictions of a probabilistic future: An artificial neural network analysis. Society for Neuroscience 2014, Nov 15-19, Washington D.C., USA.
14. Aronson S, **Amlie-Wolf A**, Loose MD. (2012) Making predictions in a stochastic environment: Strategies underlying the probability matching phenomenon and corresponding event-related potentials. Society for Neuroscience 2012, Oct 13-17, New Orleans, USA.
15. Loose MD, Aronson S, Scott H, Mehta T, Wang A, **Amlie-Wolf A**, Welch K. (2011) Salience is not always salient: Neither magnitude nor valence of expected outcome contributes to the N2/P3 event-related potential complex in a Go/NoGo task. Society for Neuroscience 2011, Nov 12-16, Washington D.C., USA.

ACADEMIC AND PROFESSIONAL HONORS

2017: 1^{st} place poster award in basic science category at UPenn Institute on Aging Retreat
2015 - Present: Predoctoral Trainee in Age Related Neurodegenerative Diseases, NIH/NIA T32 AG00255
2013: Nancy Robell Prize in Neuroscience, Oberlin College
2013: Graduated with High Honors in Computer Science
2013: Inducted into Phi Beta Kappa
2009-2013: John F. Oberlin Merit Scholarship
2009-2013: National Merit Scholarship Finalist
2005-2009: Lower Merion High School Honor Roll

ACADEMIC SERVICE

Member of committee to update individual development plans (IDP) 2016-2017
Biomedical Graduate Studies, University of Pennsylvania *Philadelphia, PA*

Reviewer for APBC and BIBM Conferences 2017-2018

Organizer for student-invited Penn Bioinformatics Forum talks Fall 2014-Spring 2016
Institute for Biomedical Informatics, University of Pennsylvania *Philadelphia, PA*

TEACHING EXPERIENCE

TA and course development for GCB535: Introduction to Bioinformatics Spring 2016
Biomedical Graduate Studies, University of Pennsylvania *Philadelphia, PA*

Tutor for BIOM555: Regulation of the Genome Spring 2015
Biomedical Graduate Studies, University of Pennsylvania *Philadelphia, PA*

Grader for Computer Science 275: Programming Abstractions Spring 2013
Department of Computer Science, Oberlin College *Oberlin, OH*

Grader for Computer Science 151: Principles of Computer Science II Fall 2012
Department of Computer Science, Oberlin College *Oberlin, OH*

Grader for Computer Science 150: Principles of Computer Science I Spring 2012
Department of Computer Science, Oberlin College *Oberlin, OH*

Tutor for Computer Science 151: Principles of Computer Science II Fall 2011
Department of Computer Science, Oberlin College *Oberlin, OH*

SOCIETY MEMBERSHIPS

American Society of Human Genetics, Alzheimer's Association, Phi Beta Kappa (Zeta of Ohio Chapter), Sigma Xi, The Pledge of the Computing Professional, Society for Neuroscience

EXTRACURRICULAR ACTIVITIES

Avid Musician: Oboe, Bass Guitar, Guitar, Piano, Drums, Vocals, Double Bass, Mandolin.
`https://alexamliewolf.bandcamp.com`
`https://soundcloud.com/alexamlie/`
`https://www.youtube.com/c/AlexAmlieWolf`

'Honorary' Member of Oberlin Conservatory Oboe Studio, played with the Oberlin Chamber Orchestra (usually open only to Conservatory music students, extremely rare for a wind player)

Member of the Competitive Computer Programming Club at Oberlin, competed at the Denison Programming Contest and the ACM International Collegiate Programming Contest