

# ANN SIZEMORE BLEVINS

Postdoctoral Researcher in Bioengineering at the University of Pennsylvania

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## EXPERIENCE

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Postdoctoral Researcher (Applied Topology)

**University of Pennsylvania Bioengineering, Bassett Lab**

December 2019 – current Philadelphia, PA

- Collaborate with neuroscientists to develop system-specific methods for addressing research questions.
- Pioneer independent computational research, contribute to collaborative projects, and mentor a research assistant.
- Design data visualizations and illustrations for lab research projects, and communicate independent research findings through submitted papers and conference presentations.
- Explore and strategize new research directions in computational biology through grant writing.
- Partner with a Penn cancer lab to provide computational consultation for projects focused on mechanisms of drug resistance.

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Associate Computational Biologist

**Broad Institute of MIT and Harvard, Hahn Lab**

January 2016 – May 2017 Cambridge, MA

- Contributed to the scalability and upkeep of the data processing pipeline for the Achilles genetic knock-down screen that consisted of hundreds of cancer cell lines.
- Developed and performed graph-based analyses for a cross-platform cancer cell line dataset to highlight possible drug targets, in collaboration with the Cancer Target Discovery and Development program.
- Performed statistical tests on genetic perturbation data that supported the discovery of a novel drug target in chordoma.

## TECHNICAL SKILLS

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- *Data Analysis:* julia, MATLAB, Python, R, Docker, git.
- *Visualization:* D3, JavaScript, HTML, CSS, Adobe Illustrator, Adobe After Effects.

## SCIENTIFIC COMMUNICATION

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- Delivered over 20 research presentations and seminars; of these, four were international.
- Organized and taught the Applied Topology in Neuroscience Seminar for graduate students. Spring 2018.
- Led four review papers detailing computational methods in algebraic topology and network science for a neuroscience and biology audience.
- Authored or co-authored five published papers involving neural datasets, including those from MRI and fMRI experiments.
- Taught undergraduate Biostatistics with Python at the University of Pennsylvania. Spring 2020.

## EDUCATION

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Ph.D. Bioengineering

**University of Pennsylvania**

January 2017 – November 2019

M.S.E. Bioengineering

**University of Pennsylvania**

August 2014 – December 2015

B.S. Biology, B.A. Mathematics

**Boston College**

August 2010 – May 2014

## PROJECTS

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**Topology of the human connectome**

- Densely connected brain regions support rapid communication, but in parallel processing the wiring requires a specific lack of connections. Using algebraic topology, this work found that multiple voids exist in the structural brain network across healthy adults. *MATLAB*

**Structural robustness of spreading processes**

- Biological processes grow and develop, but often do so in the presence of noise. This work devised topological methods to measure the amount to which spreading structures may – or may not – change in the presence of noise. *julia, R, MATLAB, git*

**Multilayer network visualization**

- Developed code to plot an interactive D3 visualization of multilayer networks generated with the Python package Multinetx. *D3, JavaScript, HTML, CSS, Python, Docker, git*

**Simplicial complex visualization**

- In progress. Constructing a julia package for visualizing topological data analysis data structures. *D3, JavaScript, HTML, CSS, julia, Docker, git*

**Topological data analysis tutorial**

- Built a repository with example analyses for four main topological methods: Mapper, persistent homology, path signatures, and sheaf cohomology. *Python, julia, Docker, git*

**Scientific illustration**

- Created commissioned schematics, main figures, and cover art submissions for projects in neuroscience and physics. *Adobe Illustrator*