

David A. Buch

Contact Information	Department of Statistical Science Duke University Durham, NC 27705	<i>Email:</i> david.buch@duke.edu <i>Website:</i> davidbuch.github.io
Education	Duke University , Durham, NC Ph.D. Statistical Science	In Progress
	West Virginia University , Morgantown, WV M.S., Applied Mathematics B.S., Mathematics, Physics <i>Summa cum Laude</i> & Honors College Certification	2019 2018
Honors and Awards	<ul style="list-style-type: none">• National Merit Scholar 2014• National Advanced Placement Scholar 2014• United States Presidential Scholar 2014• West Virginia University Whitehill Memorial Award 2015• West Virginia University Eberly Scholar 2018• West Virginia University Outstanding Senior 2018	
Peer-Reviewed Publications	<i>Improving performance of SEOBNRv3 by $\sim 300\times$</i> T.D. Knowles, C. Devine, D.A. Buch , S.A. Bilgili, T.R. Adams, Z.B. Etienne, S.T. McWilliams. <i>Classical and Quantum Gravity</i> . 35: 15	2018
	<i>Collective repacking reveals that the structures of protein cores are uniquely specified by steric repulsive interactions</i> J.C. Gaines, A. Virrueta, D.A. Buch , S.J. Fleishman, C.S. O'Hern, and L. Regan. <i>Protein Eng. Des. Sel.</i> 30: 387	2017
Management Experience	<i>Data+ Project Manager</i> Rhodes Information Initiative at Duke University <ul style="list-style-type: none">• For ten weeks, managed a team of three duke undergraduate and masters degree students working full time to complete a data science project.• Adopted Agile (Scrum) project management practices and served as liaison between student team and client.• Coordinated team Git repository, Slack channel, and Notion page. Gained familiarity with other project management tools such as GitLab.	Summer 2020
Teaching Experience	<i>Graduate Teaching Assistant (Statistics)</i> Duke University, Durham, NC <ul style="list-style-type: none">• Fall 2019: STA 250 (Statistical Inference)• Fall 2020: STA 440 (Case Studies)*• (*) - Indicates only partial assignment due to research funding	Fall 2019-

Graduate Teaching Assistant (Mathematics) **Fall 2018 - Spring 2019**
 West Virginia University, Morgantown, WV

- Fall 2018: Lab TA & Exam Grader for MATH 153 (Calculus I)
- Spring 2019: Guest Instructor, Data Analysis and Visualization with R, MATH 694 (Professional Tools Seminar)*
- (*) - Indicates only partial assignment due to research funding

One-on-one Teaching **Since Fall 2013**

- Spring 2020: Duke SPIRES Tutor for the Actuarial Exam in Probability
- Fall 2017- Fall 2019: GRE Tutor for NextStep (Blueprint) Test Prep - Promoted to “Premium” Tutor in Spring 2019
- Fall 2016: Math, Physics, and Chemistry Tutor for the WVU Athletic Department
- Fall 2013-Spring 2014: Private Violin/Cello Instructor at School of Harmony in Beaver, WV

Computing

Published Software:

- *gretel: Generalized Path Analysis for Social Networks* **2019**
D.A. Buch. Comprehensive R Archive Network.

Languages: R, C/C++, Matlab, Python, Linux/Unix Command Line Scripts, L^AT_EX
Other: Cluster/shared computing resources and Slurm, Git

Presentations

Seeking Informative Latent Clusters in Multivariate Categorical Data **2020**
 Duke Student Seminar

PCA, CCA, LDA, FA, ETC: A Comparative Review of Linear Alphabet Soup **2020**
 Duke Summer Student Seminar Series

Tie Strength, Optimal Connections, and Distance in Social Networks **2019**
 West Virginia University M.S. Thesis Defense

Defining the Characteristics of a West Virginian, First-Generation, and Rural STEM Student **2019**

M. Darrah, R. Humbert, D.A. Buch
 Poster presentation at the West Virginia Academy of Science Annual Meeting

SEOBNRv3_opt - A Case Study in Code Optimization for the Benefit of LIGO Science **2018**

D.A. Buch, Z.B. Etienne
 Oral presentation at the 28th Annual Midwest Relativity Meeting (University of Wisconsin - Milwaukee)

Optimized Numerical Approximation of Einstein's Equations through Coordinate System Management **2018**

Poster presentation at WVU Mathematics Department Capstone Day

Experimental Validation of van der Pol Oscillator Theory in a Unijunction Transistor Circuit Model System **2018**

Poster presentation at WVU Physics Department Spring 2018 Undergraduate Research Day

Graphite-Lattice measurement through Matter-Wave Diffraction **2017**
 Poster presentation at WVU Physics Department Fall 2017 Undergraduate Research Day

Evaluating a Simplified Approach to Protein Modeling Using Rotamer Recovery Tests and the Rosetta Software Suite **2015**
 Poster presentation and oral presentation at Raymond and Beverly Sackler Institute NSF-REU (Yale University)

Academic Program Participation	<i>NSF INCLUDES - Graduate Research Assistantship</i>	Spring-Summer 2019
	<i>LIGO Scientific Collaboration</i>	Summer 2016
	<i>Raymond and Beverly Sackler NSF-REU in Biophysics</i>	Summer 2015

Service and Outreach	WVU Math Club Vice-President, Treasurer (2017-2019)
	WV Chapter of the Sierra Club, Executive Committee (2017-2018)
	WVU Sierra Student Coalition, Vice President (2017-2018)
	WV Science Public Outreach Team Ambassador (2014-2016)
	Trinity Christian School Science Fair Judge (2019)
	WV Math and Science Bowl Judge (2015)

Music	WVU Symphony Orchestra, WVU Undergraduate String Quartet, WVSO Vaughan Fellowship 2013, WV All-State Orchestra 2012-2014
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Other Work Experience	<i>Daily Athenaeum - Copy Writer</i>	Spring 2016
	West Virginia University, Morgantown, WV	

	<i>Line Server</i>	Fall 2013-Spring 2014
	Qdoba Mexican Grille, Beckley, WV	