

# Sheridan B. Green

<https://sheridan.green> | [GitHub: shergreen](#) | [LinkedIn: sheridan-green](#)

Email : [me@sheridan.green](mailto:me@sheridan.green)

Mobile : +1 (704) 305-7565

## EDUCATION

- **Yale University** New Haven, CT  
*PhD, Physics* | *GPA: 3.78/4.00 (7 H, 2 HP)* | *Physics GRE: 990 (94%)* *Aug. 2017 - Dec. 2021 (expected)*
- **The University of North Carolina at Chapel Hill** Chapel Hill, NC  
*BS, Physics and Mathematic* | *GPA: 3.93/4.00* *Aug. 2013 - May 2017*

## RESEARCH EXPERIENCE

- **Yale University** New Haven, CT  
*Graduate Research Fellow* *Aug. 2017 – Present*
  - **SatGen**: **Co-author** and **maintainer** of the SatGen Python library, a Monte Carlo-based semi-analytical dark matter halo generator that surpasses cosmological simulations with respect to statistical power and numerical resolution.
  - **DASH**: **Co-author** of a **publicly available library** of dark matter  $N$ -body simulations. Wrote Bash and Slurm scripts to automate the scheduling, restarting, analysis, and verification of  $\sim 2,000$  GPU-accelerated simulations.
  - **Subhalo evolution**: Augmented SatGen with a DASH-calibrated tidal evolution model. Quantifying adverse impact of numerical artifacts that plague state-of-the-art cosmological simulations.
  - **Galaxy cluster masses**: Used mock X-ray observations of simulated clusters to develop a precise mass estimator to be applied to *eROSITA* survey. **Reduced mass scatter by 20%** relative to benchmark using an ensemble learning approach. Employed stratified  $k$ -fold cross-validation and optimized hyperparameters using grid-search CV.
  - **Persistent homology**: **Co-author** of the SCHU method for identifying cosmic voids and filament loops in cosmological simulations/surveys, which assigns a statistical significance to each object using persistence diagrams and bootstrap sampling.
  - **Cluster pressure profiles**: Developed a Monte Carlo-based physical model of turbulence evolution in the intra-cluster medium, which was used to illuminate the source of **a large fraction of scatter in cluster mass estimates**.
- **The University of North Carolina at Chapel Hill** Chapel Hill, NC  
*Undergraduate Research Assistant* *Aug. 2014 – May 2017*
  - **Microhalos**: **Thesis awarded highest honors**. Ran and analyzed large  $N$ -body simulations using a distributed computing system. Wrote visualization routines. Worked with  $k$ -NN density estimation. Built analytical models.

## PUBLICATIONS [[SCHOLAR](#)][[ADS](#)][[ARXIV](#)][[ORCID](#)]

Author of 9 academic research articles with an  $h$ -index of 4 and 54 total citations (from NASA ADS)

- **Green S. B.** et al., 2020, *MNRAS*, 496, 2743
- **Green S. B.** et al., 2019, *ApJ*, 884, 33
- **Green S. B.**, vdBosch F. C., 2019, *MNRAS*, 490, 2091
- **Green S. B.** et al., 2019, *CHANCE*, 32:3, 6

## HONORS AND AWARDS

- **NSF Graduate Research Fellowship** (2019)
- **UNC Shearin Outstanding Senior Award in Physics** (2017)
- **Yale McDougal Teaching Fellowship** (2019)
- **NOAA Ernest F. Hollings Scholarship** (2015)

## COMPETITIONS

- **Citadel Data Open 2020**: **Awarded third place** (of 39 teams) in the East Coast Regional Virtual Datathon, September 14–21, 2020.

## TEACHING AND ADVISING EXPERIENCE

- **Graduate Teaching Fellow (2017 – 2020)**: Taught mechanics and electronics labs for 8 terms; received highly positive **evaluations**.
- **Research Advisor**: Supervised 3 undergraduate research projects, leading one to **publication**.
- **McDougal Teaching Fellow (2019 – 2020)**: Led workshops on advanced topics in pedagogy at **Yale CTL**. Will graduate with a **Certificate of College Teaching Preparation**.

## SELECTED COURSEWORK

Bayesian Probability and Statistics, Linear Algebra, Real Analysis, Mathematical Methods of Physics, Financial Markets, Data Structures, Systems Programming and Computer Organization (enrolled), Database Systems (enrolled)

## TECHNICAL SKILLS

- **Programming**: Advanced: Python; Intermediate: C/C++,  $\LaTeX$ , Bash; Novice: SQL
- **Scientific Computing**: UN\*X, Slurm, Numpy, SciPy, matplotlib, scikit-learn, Keras, Numba, pandas, seaborn, git
- **Research**: Numerical simulations, analytical modeling of physical systems, persistent homology, ensemble regression

Updated September 22, 2020