Nathan J. Goldbaum

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Employment

Recurse Center

Recurser — Summer 2019

National Center for Supercomputing Applications

Research Scientist — 2017 – 2019

Postdoctoral Researcher, Data Exploration Lab — 2015 – 2017

Education

University of California Santa Cruz

Dissertation: "Star Formation in Graivtationally Unstable Disk Galaxies: From Clouds to Disks"

Ph.D. Astronomy & Astrophysics — 2011 – 2015

NSF Graduate Research Fellow — 2010 – 2013

M.S. Astronomy & Astrophysics — 2009 – 2011

University of Colorado Boulder

B.A. Physics, *Summa Cum Laude* — 2005 – 2009

Open Source Contributions[†]

yt

An analysis and visualization toolkit for volumetric data.

Core Contributor, Steering Committee Member, and Project Member — 2012 – 2019

- Regularly contributed to project management and planning, including design and implementation discussions, code review, and user support on IRC and mailing lists.
- More than 650 merged pull requests

Released `yt` unit system as a standalone package — 2018 – 2019

- Extracted `yt.units` module into a standalone package with continuous integration, 100% test coverage, and extensive example-driven documentation.

Improving support for particle data — 2016 – 2018

- Substantially improved performance and memory usage for common analysis tasks.
- Presented work to the community at a SciPy conference talk.
- Worked with community to provide migration path for analysis results requiring data produced by old API.

[†]See https://www.openhub.net/accounts/ngoldbaum for a contribution summary

Symbolic Unit System 2013 – 2014

- Designed `YTArray`, an array data container for automatically handling unit conversions and runtime validation for dimensional correctness of mathematical operations.
- Led the development effort that systematically updated `yt` to make use of the unit system.

`PlotWindow` Plotting Interface 2012

- Created an interface for visualizing slices and projections of simulation data.
- Enables quick data visualization through an API that focuses on what the simulation data physically represents rather than how it is laid out on disk.
- Used in dozens of published journal articles written by `yt` users.
- Responsible for the initial design, implementation, documentation, and ongoing maintenance.

Additional Contributions

Enzo: High performance parallel astrophysics simulation code, contributed more than 50 pull requests

Grackle: Astrophysics thermal chemistry library, Set up an automated test suite and continuous integration

Matplotlib: Contributed bugfixes and minor improvements in 11 merged pull requests.

Mercurial: Several bugfixes and minor improvements.

xonsh: Added integration with the mercurial version control System.

Jupyter: Provided bugfixes and minor improvement to several Jupyter projects including `ipywidgets`, `IPython`, and `nbconvert`.

First Author Publications

"`unyt`: Handle, manipulate, and convert data with physical units in Python", **Goldbaum, N. J.**, ZuHone, J. A., Turk, M. J., et al. 2018, The Journal of Open Source Software, 3, 809.

"Mass Transport and Turbulence in Gravitationally Unstable Disk Galaxies II: The Effects of Star Formation Feedback", **Goldbaum, N. J.**, Krumholz, M. R., & Forbes, J. C., *Astrophysical Journal*, 2016, 827, 28

"Mass Transport and Turbulence in Gravitationally Unstable Disk Galaxies. I: The Case of Pure Self-Gravity", **Goldbaum, N. J.**, Krumholz, M. R., & Forbes, J. C., *Astrophysical Journal*, 2015, 814, 131

"The Global Evolution of Giant Molecular Clouds II: The Role of Accretion", **Goldbaum, N. J.**, Krumholz, M. R., Matzner, C. D., McKee, C. F. *Astrophysical Journal*, 2011, 738, 101

"The Intensity Profile of the Solar Supergranulation", **Goldbaum, N. J.**, Rast, M. P., Ermolli, I., Sans, J. S., Berilli, F. *Astrophysical Journal*, 2009, 707, 67

Talks and Proceedings

"The Demeshening: The Next Generation of Particle Support in yt", **Goldbaum, N. J.**, Lang, M. M., SciPy, 2017

"Domain Specific Visualization", **Goldbaum, N. J.**, PlotCon NYC, 2016

"Publicly Releasing a Large Simulation Dataset", **Goldbaum, N. J.**, Python in Astronomy Conference, 2016

"`yt`: Volumetric Data Analysis", **Goldbaum, N. J.** on behalf of the `yt` project, SciPy conference, 2014