

## CONTACT INFORMATION

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## CURRENT POSITION

**Northwestern University** 2016 - present  
Ph.D. Candidate, Advisor: Claude André Faucher-Giguère

**Adler Planetarium** 2022 - present  
Visiting Research Scholar

## EDUCATION

**Northwestern University** 2018  
M.S. Astronomy

**Carnegie Mellon University** 2016  
B.Sc. Physics, Astrophysics Track  
College & University Honors

## GRANTS / FELLOWSHIPS

5. **NSF Graduate Fellowship** 2020 - 2023  
National Science Foundation Fellowship · recruits high-potential, early-career scientists and engineers and supports their graduate research for three years.
4. **IDEAS Data Science Training Fellowship** 2019 - 2020  
National Science Foundation Traineeship/Fellowship · supports graduate students in data-enabled science and engineering by offering NSF level graduate funding for one year and access to a battery of interdisciplinary courses in statistics and machine learning. Fellows also receive funding for an internship in industry and the opportunity to contribute to the development of a citizen science project. For more information visit [ideas.ciera.northwestern.edu](https://ideas.ciera.northwestern.edu).
3. **Blue Waters Graduate Fellowship** 2018 - 2019  
National Center for Supercomputing Applications Fellowship · provides PhD students with a year of support, an allocation of 50,000 node-hours on the powerful Blue Waters petascale computing system, and funds for travel to a Blue Waters Symposium to present research progress and results.
2. **DSI Data Science Fellowship** 2016 - 2017  
Northwestern University Fellowship · supports first year graduate students dedicated to the exploration of fundamental and applied advancement in data science as part of the university's Data Science Initiative (DSI). Up to 15 students are awarded this additional funding per year.
1. **NASA Illinois Space Grant Research Program** 2016  
State Grant · supports undergraduate and incoming graduate students for a 10 week summer research session before the official start of classes. Up to 10 students are awarded this source of funding per year.

## STUDENTS MENTORED (2 high school + 2 undergrad/grad + 1 grad)

5. Megan Tillman (grad) - 2022 - Rutgers University, NJ - The Low-redshift Ly $\alpha$  Forest as a Constraint for Models of AGN Feedback
4. Maggie Kraft (high school) - 2021 - Lane Technical High School Chicago, IL - Zooniverse citizen science project PI interviews for Into the "Zooniverse" annual report
3. Kei Smith (high school) - 2021 - James B. Conant High School, Schaumburg, IL - Zooniverse citizen science project PI interviews for Into the "Zooniverse" annual report
2. Mahlet Shiferaw (undergrad) - 2018 - Harvard University - Visualizing CHIMES chemical abundances in Firefly
1. José Flores Velázquez (undergrad/grad) - 2017-2019 - Cal Poly Pomona / UC Irvine - The time-scales probed by star formation rate indicators for realistic, bursty star formation histories from the FIRE simulations

## SELECTED AWARDS / HONORS

8. **Northwestern University, Data Visualization Contest** 2022  
Animated Visualization Competition Grand Prize

- |                                     |   |           |
|-------------------------------------|---|-----------|
| 7.                                  | <b>Northwestern Science in Society Scientific Image Contest</b><br>Second Place Prize & People's Choice Award   | 2018      |
| 6.                                  | <b>Laws of Star Formation Conference</b><br>Honorable Mention in Poster Competition   | 2018      |
| 5.                                  | <b>Northwestern University, Computational Research Day</b><br>Animated Visualization Competition Grand Prize  | 2018      |
| 4.                                  | <b>Phi Beta Kappa</b><br>National Honor Society   | 2016      |
| 3.                                  | <b>Phi Kappa Phi</b><br>National Honor Society  | 2016      |
| 2.                                  | <b>Andrew Carnegie Society</b><br>University Service & Honor Society  | 2015      |
| 1.                                  | <b>Dean's List High Honors</b><br>Carnegie Mellon University  | 2012-2016 |
| - COMPUTATIONAL RESOURCES ALLOCATED |   |           |
| 2.                                  | <b>Quest</b><br>P.I. · Northwestern University<br>GPU accelerated interstellar chemistry with WIND, a (mostly) general stiff ODE solver                               | 35k NH    |
| 1.                                  | <b>Blue Waters</b><br>P.I. · National Center for Supercomputing Applications<br>GPU Accelerated Time-Dependent Chemistry in the Context of Galaxy Formation with WIND | 50k NH    |

## SELECTED PUBLICATIONS WITH MAJOR CONTRIBUTIONS

(ADS Library; <sup>†</sup>student led)

6. Burkhart, B., Tillman, M., **Gurvich, A. B.**, et al. 2022, The Low-redshift Ly $\alpha$  Forest as a Constraint for Models of AGN Feedback, *ApJL*, 933, L46
5. **Gurvich, A. B.**, Stern, J., Faucher-Giguère, C.-A., et al. 2022, Rapid disc settling and the transition from bursty to steady star formation in Milky Way-mass galaxies, arXiv e-prints; subm. *MNRAS*
4. <sup>†</sup>Flores Velázquez, J. A., **Gurvich, A. B.**, Faucher-Giguère, C.-A., et al. 2021, The time-scales probed by star formation rate indicators for realistic, bursty star formation histories from the FIRE simulations, *MNRAS*, 501, 4812
3. **Gurvich, A. B.**, Faucher-Giguère, C.-A., Richings, A. J., et al. 2020, Pressure balance in the multiphase ISM of cosmologically simulated disc galaxies, *MNRAS*, 498, 3664
2. **Gurvich, A.**, Burkhart, B., & Bird, S. 2017, The Effect of AGN Heating on the Low-redshift Ly $\alpha$  Forest, *ApJ*, 835, 175
1. **Gurvich, A.**, & Mandelbaum, R. 2016, The impact of correlated noise on galaxy shape estimation for weak lensing, *MNRAS*, 457, 3522

## – SOFTWARE

4. **Gurvich, A. B.**, & Geller, A. M. 2022, Firefly: a browser-based interactive 3D data visualization tool for millions of data points, arXiv e-prints; subm. *ApJS*
3. **Gurvich, A. B.** 2022, FIRE Studio: Movie making utilities for the FIRE simulations, *Astrophysics Source Code Library*, ascl:2202.006
2. Grudić, M., & **Gurvich, A.** 2021, pytreegrav: A fast Python gravity solver, *The Journal of Open Source Software*, 6, 3675
1. Geller, A. M., & **Gurvich, A.** 2018, Firefly: Interactive exploration of particle-based data, *Astrophysics Source Code Library*, ascl:1810.021

N<sup>TH</sup>-AUTHOR PUBLICATIONS

8. Chan, T. K., Kereš, D., **Gurvich, A. B.**, et al. 2022, The impact of cosmic rays on dynamical balance and disk-halo interaction in L $\star$  disk galaxies, *MNRAS*, arXiv:2110.06231
7. Hafen, Z., Stern, J., Bullock, J., et al. 2022, Hot-mode accretion and the physics of thin-disc galaxy formation, *MNRAS*, 514, 5056
6. Wetzel, A., Hayward, C. C., Sanderson, R. E., et al. 2022, Public data release of the FIRE-2 cosmological zoom-in simulations of galaxy formation, arXiv e-prints, arXiv:2202.06969
5. Yu, S., Bullock, J. S., Klein, C., et al. 2021, The bursty origin of the Milky Way thick disc, *MNRAS*, 505, 889
4. Stern, J., Faucher-Giguère, C.-A., Fielding, D., et al. 2021, Virialization of the Inner CGM in the FIRE Simulations and Implications for Galaxy Disks, Star Formation, and Feedback, *ApJ*, 911, 88
3. Mercado, F. J., Bullock, J. S., Boylan-Kolchin, M., et al. 2021, A relationship between stellar metallicity gradients and galaxy age in dwarf galaxies, *MNRAS*, 501, 5121
2. Hernandez, S., Aloisi, A., James, B. L., et al. 2021, First Cospatial Comparison of Stellar, Neutral-gas, and Ionized-gas Metallicities in a Metal-rich Galaxy: M83, *ApJ*, 908, 226
1. Orr, M. E., Hayward, C. C., Medling, A. M., et al. 2020, Swirls of FIRE: spatially resolved gas velocity dispersions and star formation rates in FIRE-2 disc environments, *MNRAS*, 496, 1620

## TALKS

15. **Flatiron Institute CCA, Galaxy Formation Group Meeting** 2022  
seminar - invited talk - Alex Gurvich  
Rapid galactic disk settling at the end of bursty star formation in the FIRE simulations
14. **Columbia University, Special Seminar** 2022  
seminar - invited talk - Alex Gurvich  
Rapid galactic disk settling at the end of bursty star formation in the FIRE simulations
13. **University of California: Irvine, Disk Formation Workshop** 2022  
workshop - invited talk - Alex Gurvich  
Rapid galactic disk settling at the end of bursty star formation in the FIRE simulations
12. **Harvard Center for Astrophysics, CfA Seminar** 2022  
seminar - invited talk - Alex Gurvich  
Rapid galactic disk settling at the end of bursty star formation in the FIRE simulations
11. **STScI, Galaxy Journal Club** 2022  
journal club - invited talk - Alex Gurvich  
Rapid galactic disk settling at the end of bursty star formation in the FIRE simulations
10. **A Holistic View of Stellar Feedback and Galaxy Evolution** 2022  
conference - contributed talk - Alex Gurvich  
Rapid galactic disk settling at the end of bursty star formation
9. **Virtual Ringberg Seminar Series** 2021  
seminar - invited virtual talk - Alex Gurvich  
Rapid disk settling at the end of bursty star formation
8. **GALSPEC2021** 2021  
virtual conference - contributed recorded talk - Alex Gurvich  
Feedback regulated star formation in galaxies evolving from bursty clumps to time-steady disks
7. **Flatiron Insitute CCA, Thursday Lunch** 2020  
virtual seminar series - invited virtual talk - Alex Gurvich  
The origin of the KS Relation in star forming galactic disks
6. **Princeton, Galaxy Journal Club** 2020  
virtual journal club - invited virtual talk - Alex Gurvich  
Pressure balance in the multiphase ISM of cosmologically simulated disc galaxies
5. **Blue Waters Symposium** 2019  
conference - poster & contributed talk - Alex Gurvich, Claude-André Faucher-Giguère  
GPU accelerated interstellar chemistry with WIND, a (mostly) general stiff ODE solver
4. **Astroviz 2018** 2018  
conference - contributed talk - Alex Gurvich, Aaron Geller  
Firefly: A web-based particle viewer
3. **Northwestern University, Seven Minutes of Science** 2017  
symposium - invited talk - Alex Gurvich  
Exploring the Universe with Computer Simulations
2. **Northwestern University, Illinois Space Grant** 2016  
symposium - invited talk - Alex Gurvich, Claude-André Faucher-Giguère  
Regulated Star Formation in the FIRE Simulations
1. **Harvard Center for Astrophysics, REU Symposium** 2015  
symposium - invited talk - Alex Gurvich, Blakesley Burkhart, Simeon Bird, Lars Hernquist  
Magnetic Turbulence and Line Broadening in Simulations of Lyman-Alpha Absorption

## POSTERS

5. **Feedback 2019** 2019  
conference - poster - Alex Gurvich, Claude-André Faucher-Giguère  
Vertical Hydrostatic Balance in Galactic Disks from the FIRE Simulations
4. **Laws of Star Formation** 2018  
conference - poster - Alex Gurvich, Claude-André Faucher-Giguère  
Vertical Hydrostatic Balance in Galactic Disks from the FIRE Simulations

3. **Northwestern University, Computational Research Day** 2017  
symposium - poster - Alex Gurvich, Claude-André Faucher-Giguère  
Studying Galactic Winds Using High-Resolution Numerical Simulations of Galaxy Evolution
2. **Meeting # 227 of the American Astronomical Society** 2016  
conference - poster - Alex Gurvich, Blakesley Burkhart, Simeon Bird  
Magnetic Turbulence and Line Broadening in Simulations of Lyman-Alpha Absorption
1. **Carnegie Mellon University** 2015  
symposium - poster - Alex Gurvich, Rachel Mandelbaum  
The impact of correlated noise on galaxy shape estimation for weak lensing

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**STUDENTS MENTORED (2 high school + 2 undergrad/grad + 1 grad)**

5. Megan Tillman (grad) - Rutgers University, NJ - Demonstrated the utility of the low-redshift Lyman $\alpha$  Forest as a constraint for models of AGN feedback by comparing statistics of the Ly $\alpha$  forest in the Illustris and Illustris-TNG simulations.
4. Maggie Kraft (high school) - Lane Technical High School Chicago, IL - Interviewed researchers of Zooniverse citizen science projects and produced written summaries for the annual "Into the Zooniverse" book and video content for social media as part of the Adler Planetarium's summer teen internship program.
3. Kei Smith (high school) - James B. Conant High School, Schaumburg, IL - Interviewed researchers of Zooniverse citizen science projects and produced written summaries for the annual "Into the Zooniverse" book and video content for social media as part of the Adler Planetarium's summer teen internship program.
2. Mahlet Shiferaw (undergrad/grad) - Harvard University - Used Firefly to visualize CHIMES chemical abundances  
Developed new functionality in Firefly to color particles by arbitrary scalar fields from FIRE simulation output. Used this new functionality to explore the distribution of HII and CO across the face of galactic disks run with CHIMES, a non-equilibrium chemistry module for galaxy formation simulations.
1. José Flores Velázquez (undergrad/grad) - Cal Poly Pomona - Star formation indicators with bursty star formation histories  
Modeled the H $\alpha$  and FUV luminosities of galaxies from the FIRE simulations using SLUG and BPASS, two widely used spectral modeling tools. Found the best fit averaging timescale for H $\alpha$  and FUV as indicators of star formation rate using realistic star formation histories extracted from the simulations.

**COURSES TAUGHT**

3. **Northwestern University** 2017 - 2018  
teaching assistant · Astronomy-120 & Astronomy-101 & Astronomy-111 · taught a weekly lab section using the Dearborn 18.5" refracting telescope. Introduced students to the history of the historic Dearborn Observatory followed by an hour of observing seasonal objects in the night sky.
2. **Wilmette Junior High Science Olympiad: Reach for the Stars** 2016  
teacher · drafted lesson plans and taught an after-school class of 5-8th grade students in basic astronomy and stellar evolution at a Chicago junior high school.
1. **Pennsylvania Governor's School** 2014  
teaching/resident assistant · taught lecture, lab, and elective sections, while also mediating disputes and assisting students in their dormitories as a live-in counselor and administrator. Graded homeworks, held office hours and discussion sections, and led hands-on lab instruction.

## DEPARTMENTAL/SCIENTIFIC COMMUNITY SERVICE &amp; ADVOCACY

9. **Overleaf Campus Advisor** 2022 - present  
chief point of contact & organizer · Led the push to secure institutional funding of a group license of Overleaf, the popular web-based LaTeX typesetting application, for graduate students. Interfaced between company sales representatives and university administration to make a working action plan to implement Overleaf adoption at Northwestern University.
8. **CIERA Public Outreach Coordinating Committee** 2022 - present  
invited committee member · Invited to sit on the inaugural joint committee of faculty, postdocs, and graduate students with responsibility of coordinating and steering the department's public outreach programs.
7. **Justice, Equity, Diversity, and Inclusion Mentorship Action Team** 2022 - present  
team member · Led the development of a paired mentorship need survey and matching algorithm in order to build an extended multi-level mentorship network.
6. **FIRE Collaboration Seminar Committee** 2021 - present  
Committee member · Solicited applications, evaluated abstracts, selected speakers, and organized the monthly FIRE Collaboration seminar-series as part of a team of three. Designed and tailored application system to highlight focus of series on junior members of the collaboration.
5. **P&A Faculty Search Committee** 2021  
graduate student liaison · Co-led the graduate student interviews of faculty candidates. Produced extensive written summary for Faculty Search Committee representing the graduate students' feedback and impressions of candidates. Additionally presented this feedback to at a Search Committee meeting and sat in on final vote at P&A faculty meeting.
4. **Blue Waters Graduate Fellowship** 2021  
application reviewer · Reviewed applications for the 2021 iteration of the Blue Waters Graduate Fellowship.
3. **Social Justice Initiative K12 Outreach Committee** 2020 - 2021  
committee member · Synthesized input from local K12 teachers to design a series of new outreach programs directly serving teachers who self-identified as teaching at schools with predominantly underserved and underrepresented in STEM populations.
2. **Physics and Astronomy Graduate Student Council** 2018 - 2022  
Outreach Committee co-chair, Treasurer, and President · organized outreach opportunities for the graduate student community. Developed new graduate student peer mentoring program and oversaw operation of rest of council as president.
1. **Society of Physics Students** 2013 - 2016  
president, treasurer · contributed to department culture by organizing annual t-shirt designs and semesterly social events. Developed new set of events and activities with department to welcome incoming first year physics students.

## OUTREACH PROGRAMS I PLAYED A LEADING ROLE IN

10. **Pathfinder Library** 2019 - present  
editor-in-chief · architected a new program for the development of educational brochures from original idea to deployment. Available both in print at CIERA in-person events and online to be printed at home, the Pathfinder brochure library is intended to give an authoritative and broad level overview of basic topics in astronomy. Additional resources are also listed from books, online tutorials, and youtube videos. See the online pathfinder library at [ciera.northwestern.edu/pathfinder](http://ciera.northwestern.edu/pathfinder).
9. **Astronomy on Tap** 2016 - present  
chief local organizer · led the Chicago chapter of the publicly acclaimed international outreach program Astronomy on Tap (headquartered in New York City) which brings professional astronomy talks, trivia, and prizes to local bars and breweries every six weeks.
8. **Baxter Summer Scholars - Planet Detectives** 2021  
organizer · Wrote lesson plans and created simulated materials for a virtual 3-hour program for high school students to learn about Exoplanets. Students were tasked with investigating simulated lightcurves to choose the most likely candidate that hosted an exoplanet. Students were then asked to write a short proposal for follow-up spectroscopy, identify elements in the atmosphere of these planets using spectral features in simulated spectra, and finally characterize what their planet might be like based on the elements present.
7. **Math and Motion - Lincolnwood Elementary** 2021  
organizer · Developed an in-person 3-hour program for fourth and fifth grade students to learn about volume, area, and fractions by estimating the depth of Lake Michigan, building Lego creations to a specified surface area, and demonstrating the Pythagorean theorem with water and plexiglass squares.
6. **CIERA Astronomy LIVE** 2020 - 2021  
co-organizer · developed a new, flexible, virtual outreach program featuring CIERA astronomers focused on live Q&A, trivia, and short talks.
5. **Eleventh Annual CIERA Public Lecture** 2019  
volunteer coordinator and volunteer · Organized volunteers for the event's second "Ask an Astronomer" program which

aimed to connect members of the public to CIERA astronomers in an informal and casual setting. Also volunteered as part of that program.

4. **Tenth Annual CIERA Public Lecture** 2018  
volunteer coordinator and volunteer · Designed the event's first ever "Ask an Astronomer" program which aimed to connect members of the public to CIERA astronomers in an informal and casual setting. Also volunteered as part of that program.
3. **Wilmette Junior High Science Olympiad: Reach for the Stars** 2016  
teacher · drafted lesson plans and taught an after-school class of 5-8th grade students in basic astronomy and stellar evolution at a Chicago junior high school.
2. **Spring Carnival** 2015 - 2016  
head of independent booths · planned and oversaw the construction of the 101st CMU Spring Carnival, a wildly popular event with the local community that engages both members of campus and the city of Pittsburgh.
1. **CMU Astronomy Club** 2012 - 2016  
president, vice-president, observatory director · organized and facilitated annual outreach trip for >50 people to Green Bank Observatory to introduce undergraduates interested in astronomy to the fundamentals of radio astronomy. Marketed and hosted observation sessions for the public after meetings and for groups by reservation at the club's Truman Kohman Observatory.

#### OUTREACH PROGRAMS I PARTICIPATED IN

11. **Dearborn Astronomy Nights** 2017 - present  
staff · operated the historic Dearborn Telescope, an 18.5" refractor, at Northwestern's Dearborn Observatory for the weekly public observing sessions that are available both by appointment and as walk in sessions. The observatory can accommodate ~ 40 people and attracts a population of both seasoned amateur astronomers and young children alike.
10. **CIERA Astronomer Evenings** 2016 - present  
volunteer speaker · developed and delivered talks for the monthly public lectures at Northwestern's Dearborn Observatory.
9. **Celestial Bash at the Adler Planetarium** 2022  
volunteer · Answered visitors' questions in a special Astronomer Conversations at the Adler Planetarium for their annual fundraising celebration Celestial Bash.
8. **Thirteenth Annual CIERA Public Lecture** 2021  
volunteer · Moderated the event's Q&A via Zoom and live audience, coordinating with other volunteers to run microphones and vet questions.
7. **Adler Planetarium - Astronomy Conversations** 2017 - 2020  
volunteer · gave monthly talks to the public at the Adler Planetarium's Space Visualization Lab (SVL) as part of Astronomy Conversations program. As one of the world's premier planetariums in a major metropolitan area the Adler serves a diverse audience with a wide range of ages and demographics which poses a challenging, yet rewarding, outreach task.
6. **Skokie Public Library** 2018  
invited speaker · Gave an hourlong invited lecture discussing the formation of cosmic structure and its measurement using Hydrogen absorption lines using the so called "Ly $\alpha$  Forest" to the gathered residents of Skokie township.
5. **P.E.O. Chapter GC** 2018  
invited speaker · Gave an hourlong invited lecture describing the current events in astronomy ranging from landing on comets, discovering exoplanets, to the discovery and analysis of gravitational waves.
4. **Chicago Astronomical Society** 2018  
invited speaker · Gave an hourlong invited lecture discussing the formation of cosmic structure and its measurement using Hydrogen absorption lines using the so called "Ly $\alpha$  Forest" to the gathered members of the CAS.
3. **College of DuPage - STEM-CON** 2017  
volunteer · operated a booth at the College of DuPage's annual STEM-CON that engaged local families with demonstrations and conversations with STEM professionals in Chicago. Our booth alone had over 500 visitors ranging in ages from (young) children to adults.
2. **Haven Middle School** 2017  
invited speaker · presented a talk about using virtual galaxies to explore the universe to the 8th grade science classes as part of a one-off visit to a local middle school.
1. **Andrew Carnegie Society** 2015 - 2016  
service funding committee member · orchestrated the allocation of funds to service organizations across campus including Habitat for Humanity, a CMU Haiti relief effort, and Doctors without Borders.