Chris R. Gilly 0000-0003-0021-9056 Curriculum Vitae

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EDUCATION

- **PhD Candidate** in **Astrophysical and Planetary Sciences:** University of Colorado, Boulder
  - Research Interests: Space Weather, Solar Wind, Solar Atmosphere, Coronal Heating
- **2018 MS** in **Astrophysical and Planetary Sciences** : University of Colorado, Boulder
- **2015 BS** in **Physics:** Georgia Institute of Technology
  - Astrophysics Concentration. Focus on Optics. Third in Class, Highest Honors, ΣΠΣ.

RESEARCH

- **Graduate Research Assistant** for *Dr. Steven Cranmer, CU Boulder* (Sum2016 - Present)
  Forward Modelling Coronal Spectral Lines to Understand Line of Sight Effects
  - Wrote semi-empirical model in Python from scratch
  - Presented work at multiple conferences
- **Undergraduate Research Assistant** for *Dr. Rick Trebino, GA Tech* (Sp2013 - Sum2015)
  Studied Ultrafast laser pulse measurement and characterization.
  - Constructed a novel device for the measurement of complex ultrafast pulses.
  - Wrote drivers and a user-friendly software package in Matlab
- **Researcher at Heliophysics REU** at *University of Alabama in Huntsville* (Sum2014)
  Reduced Voyager UV Spectrometer Data to determine Heliospheric hydrogen density
  - Performed data analysis and manipulation using C
  - Presented Poster at AGU Fall 2014; 4th Author Paper

LEADERSHIP AND SERVICE

- **Student Representative** for the *AGU Fall Meeting* (2020-Present), SPA Section
- **Student Representative** for the *SHINE Conference* (2020-Present)
- **Graduate Event Coordinator** for the *SHINE Conference* (2017-Present)
  - Planned and coordinated hospitality and social events for students at SHINE
- **Graduate Admissions Committee Member** at *CU Boulder* (2018)
  - Vetted a competitive application pool with a strong rubric
- **Comprehensive Exam Committee Member** at *CU Boulder* (2017)
  - Confirmed the rigor and scope of the APS Comps I Exam
- **Observatory Committee Chair** at *CU Boulder* (2016)
  - Oversaw weekly open house operations at the observatory
- **Secretary** of the *Society of Physics Students* at *Georgia Tech* (2014-2015)
  - Ran weekly meetings and planned all events, including multi-day road trips
- **Robotics Team Captain** at *Lumpkin County High* (2006-2009)
  - Built four robots for the FIRST Robotics Competition

Outreach and Volunteer Work

- **Production Manager and Public Talk Facilitator** at *Fiske Planetarium* (2018 – Present)
  - Coordinated the "Science Under the Dome" Public Talk series
  - Formalized the club and wrote policies and procedures
- **Public Speaker** (2018 – Present)
  - Fiske Planetarium (Boulder, CO; 2020) – *Busting Myths about Outer Space*
  - Fiske Planetarium Podcast Interview (Broadcast, 2020) – *The Sun*
  - Recorded Planetarium Show: Explorations (Broadcast, 2019) – *Parker Solar Probe*
  - Myths and Legends Convention (Denver, CO; 2019) – The *Second Digital Age; The Future of Transportation; The Science of Sci-Fi*
  - WesterCon (Denver, CO; 2018) – The *Second Digital Age*
  - Fiske Planetarium (Boulder, CO; 2018) – The *Second Digital Age*
- **Public Observatory Host** (2013 – Present)
  - Slewed telescopes, pointed at constellations, and toured the observatory
    - Sommers-Bausch Observatory at CU (2015-Present)
    - GA Tech Observatory (2013-2015)
- **Public Physics Demo. Author + Host** – *SSF: Spark, Spin, and Freeze* (2013-2015)
  - Created an outreach club and a physics demo show appropriate for all audiences
  - Continues to be enjoyed by hundreds of elementary/middle school students, parents, and teachers each year, in several schools across metro Atlanta.
  - Trained over 100 elementary school teachers in the science behind and operation of many common physics demonstrations (Summer 2015)

Teaching Experience

- **Instructor of Record** for *ASTR 1000 The Solar System*, CU Boulder (Summer 2018)
  - Created and gave 95-minute lectures, 5 days a week for 5 weeks
  - Held office hours, managed grades, designed quizzes and homework
- **Instructor** for *CU Boulder Junior Astronauts* – Elementary Afterschool Program (2018)
  - Led a team of graduate students to design and teach a curriculum for an 8-week, hands-on afterschool program that explored the planets in our solar system
- **Instructor + Facilitator** for *ISEE Professional Development Program* (2017, 2018)
  - Over 200 hours of pedagogy workshops and curriculum development
  - Created and taught two 6-hour inquiry-based learning experiences
  - Attended two years, returning as a Design Team Leader
- **Teacher's Assistant** for *ASTR 2000 Ancient Astronomies*, CU Boulder (Sp2018)
- **Teacher's Assistant** for *Accel. Intro Astronomy I + II w/ Lab*, CU Boulder (Fa2015, Sp2016)
- **Teacher's Assistant** for *Modern Optics*, GA Tech (Fa2014)
- **Lead Camp Counselor** for *Physics Summer Camp*, GT School of Physics (Summer 2015)
  - Helped design and implement the curriculums for two, week-long summer camps (one Middle School and one High School), focusing on physics of Roller Coasters
- **Tutor** for *Physics + Programming,* Center for Academic Success, GA Tech (2013, 2015)

PUBLICATIONS

- **Gilly, C. R.** and Cranmer, S. R., "The Effect of Solar Wind Expansion and Nonequilibrium Ionization on the Broadening of Coronal Emission Lines", *The Astrophysical Journal*, vol. 901, no. 2, (2020) . doi:10.3847/1538-4357/abb1ad.
- B. Fayock, G.P. Zank, J. Heerikhuisen, **C. Gilbert**, K Scherer. 2015. "Lyman-alpha radiation pressure in the Heliosphere: Results from a 3D Monte Carlo radiative transfer simulation." Journal of Physics: Conference Series, Volume 642 , Issue 1, article id. 012007 (2015).

CONFERENCE ACTIVITIES

- Organized Sessions
  - ~~M. Rast, S. Bale, G. Cauzzi, T. Nievas-Chinchilla, C. Gilly, K. Reardon, A. Tritschler. *Multi-Messenger Heliophysics with DKIST, PSP, and SO.* **SHINE Conference**. 2020 July 13-17; Honolulu, HI~~
- Submitted Talks
  - C. Gilly, S. Cranmer, T. Berger, D. Knipp, J. Thayer. *Space Weather Education at the University of Colorado Boulder.* **NSRC Conference. 2020** March 2-4; Broomfield, CO
  - C. Gilbert, S. Cranmer. *Line of Sight Effects of Non-Equilibrium Ionization on Coronal Spectral Lines.* **SHINE Conference**. **2019** August 11; Boulder, CO
  - C. Gilbert, S. Cranmer. *Quantifying line-of-sight effects for spectroscopic measurements of Alfvén waves and turbulence in the solar corona.* The **5th SOLARNET** summer school and workshop. 2016 Aug 23-31; Belfast, Northern Ireland
- Poster Presentations
  - C. Gilly, S. Cranmer. *Solar Wind and Line of Sight Effects Broaden Coronal Spectral Lines.* **AAS SPD 51. 2020** Aug 20; Virtual
  - C. Gilbert, S. Cranmer. *The Effect of Non-Equilibrium Ionization, Resonant Scattering, and the Solar Wind on the Broadening of Coronal Emission Lines.* **AGU Conference**. **2019** Dec 8-13; Washington, D.C.
  - C. Gilbert, S. Cranmer. *Interpreting Off-Limb Emission Lines from Polar Coronal Holes.* **SHINE Conference**. **2019** Aug 8-11; Boulder, CO
  - C. Gilbert, S. Cranmer. *Forward Models of Off-Limb Emission Lines in Solar Coronal Holes.* **AAS Conference**. **2019** Jun 9-13; St. Louis, MO
  - C. Gilbert, S. Cranmer. *Refinement of a Semi-Empirical Model to Understand Spectroscopic Indications of Alfven Waves in the Solar Corona.* **AGU Conference**. **2018** Dec 10-14; Washington, D.C.
  - C. Gilbert, S. Cranmer. *Modeling Spectroscopy to Understand Alfvén Waves and Turbulence in the Solar Corona.* **SHINE Conference**. **2018** Jul 29- Aug 3; Cocoa Beach, FL
  - C. Gilbert, S. Cranmer. *Relating Spectroscopic Measurements of the Solar Corona to Alfvén Waves and Turbulence.* **SHINE Conference**. **2017** Jul 24-28; Saint-Sauveur, Quebec
  - C. Gilbert, B. Fayock, J. Heerikhuisen. *The reduction of Lyman alpha data from Voyager.* **AGU Conference**. **2014** Dec 15-19; San Francisco, CA.

CONFERENCE ATTENDANCE

- 2020
  - *AGU (Virtual)
  - AAS SPD (Virtual)
  - ~~SHINE (Honolulu, HI)~~
  - ~~Space Wx Workshop (Boulder, CO)~~
  - NSRC Suborbital (Broomfield, CO)
  - Michael Knoelker Symp. (Boulder, CO)
  - DKIST Data Workshop (Los Angeles, CA)
- 2019
  - AGU Fall Meeting (San Francisco, CA)
  - SHINE (Boulder, CO)
  - AAS + SPD (St. Louis, MO)
- 2018
  - AGU Fall Meeting (Washington, DC)
  - Polar Perspectives (Boulder, CO)
  - SHINE (Cocoa Beach, FL)
  - AAS (Denver, CO)
  - ISEE PDP (Monterey, CA/ Houston, TX)
- 2017
  - UCAR Helio Sum. School (Boulder, CO)
  - SHINE (Saint-Sauveur, Quebec)
  - ISEE PDP (Monterey, CA/ Maui, HI)
- 2016
  - Solarnet 5 (Belfast, N. Ireland)
  - SHINE (Santa Fe, NM)
  - AAS SPD (Boulder, CO)
- 2014
  - AGU Fall Meeting (San Francisco, CA)
  - REU, NSSTC (Huntsville, AL)
  - APS April Meeting (Savannah, GA)

CERTIFICATIONS AND AWARDS

- **Certificate in College Teaching** – University of Colorado (In Progress)
- **Completion of Professional Development Program** - ISEE (2017,2018)
- **Completion of Heliophysics Summer School** - UCAR (2017)
- **TA of the Year** – Astrophysics Department, University of Colorado (2016)
- **Letter of Commendation for SSF Outreach** – Physics Department, Georgia Tech (2015)

PROPOSAL EXPERIENCE

- **PI for Mock Proposal** for *Space Mission Design Class Project, CU Boulder* (Fa2015)
  Defended a NASA proposal for a CubeSat mission to study terrestrial electron precipitation.
- **PI for Mock Proposal** for *Physics of Planets Class Project, GA Tech* (Fa2014)
  Wrote and presented a mission proposal to study the dynamics of lightning on titan

PROFESSIONAL MEMBERSHIPS

- Lifetime, ΣΠΣ: Sigma Pi Sigma Honor Society
- 2017-20, AAS: American Astronomical Society
- 2014-20, AGU: American Geophysical Union
- 2014-16, SPS: Society of Physics Students
- 2014-15, APS: American Physical Society
- 2015, OSA: The Optical Society

SKILLS

- **Computer Skills:**
  - python, MATLAB, LaTeX, C, Zemax, IGOR, EAGLECAD, Mathematica, MS Office
- **Production Skills:**
  - Over 15 years of theater experience.
  - Can play the Piano, Saxophone, Guitar, Bass, and Ukulele plus Vocals.
  - Experience designing and running stage sound and lights.
  - Eloquent and engaging presenter, orator, and entertainer.

ELECTIVE COURSEWORK

- **UNDERGRADUATE**

  Physics of Planets
  Stellar Astrophysics

  Intro Aerospace Engineering
  Intro Computer Engineering
  Principles of Engineering Materials

  Optics + Lab
  Ultrafast Optics + Lab
  Circuits and Electronics + Lab

- **GRADUATE**

  Fluids I+II
  Magnetospheres
  Stellar Structure and Evolution

  Astrophysical Instrumentation
  Space Mission Design

  Hale Collage – Solar Flares
  Hale Collage – Solar Observation Techniques