

## EDUCATION

### GEORGE WASHINGTON UNIVERSITY

#### PHD IN PHYSICS

Jan 2022 | Washington D.C.

#### M.PHIL IN PHYSICS

Jan 2019 | Washington D.C.

#### GRADUATE CERT. IN HIGH PERFORMANCE COMPUTING

Reqs. Completed May 2018 | Washington D.C.

### GETTYSBURG COLLEGE

#### BS IN PHYSICS CUM LAUDE

#### MINOR IN MATHEMATICS

May 2015 | Gettysburg, PA

## SKILLS

### DATA ANALYSIS

Statistical and Bayesian Inference

Machine Learning

Deep Learning

Fourier/Wavelet Analysis

### DEVELOPMENT

C/C++, FORTRAN

MPI, OpenMP, CUDA, Hadoop

python, Flask

Mathematica, matlab

AWS, Linux, git

Postgres

### OPERATIONS

Graylog

Grafana/Prometheus

Docker

Kubernetes

## COURSEWORK

### GRADUATE

Radiative Processes

Computational Physics I-III

Intro to High Performance Computing

Cloud Computing and Big Data

Advanced Microarchitecture

### UNDERGRADUATE

Discrete Wavelet Transforms

Optics and Laser Physics

## LINKS

GitHub:// [tjacovich](#)

Gitlab:// [tjacovich](#)

LinkedIn:// [taylor-jacovich](#)

Instagram:// [@astro\\_adjacent](#)

Twitter:// [@astro\\_adjacent](#)

Medium:// [@astro\\_adjacent](#)

## AWARDS AND FELLOWSHIPS

2018-2021 Chandra X-ray Center Predoctoral Fellowship

2015-2018 Graduate Teaching Fellowship

2015 Sigma Pi Sigma: Physics Honor Society

2014 Schweizer Summer Research Grant

2011-2015 Presidential Scholarship

2011-2015 Alexion Life Sciences Scholarship

2011 Eagle Scout

## DEVELOPMENT

### SAO/NASA ADS BACK-OFFICE DEVELOPMENT

| IT SPECIALIST: BACK-OFFICE DEVELOPER/DATA ANALYST

Oct 2021 – Present | Center for Astrophysics | Harvard & Smithsonian

Worked on back-office infrastructure and microservices for **SAO/NASA**

**Astrophysics Data System**. Contributed code used to supply citation data to the **Asclepias Project**.

- Modified pipelines to interface with external brokers via webhooks.
- Updated data pipelines to provide additional functionality such as associated works and metric calculations for software records.
- Built tools to manually curate metadata of software records.
- Expanded user-accessible features for microservices.

## RESEARCH

### END TO END MODELING OF SUPERNOVA REMNANTS

| PREDOCTORAL RESEARCH FELLOW

Sept 2018 – Oct 2021 | Center for Astrophysics | Harvard & Smithsonian

Worked with **Dr. Daniel Patnaude** as part of a larger collaboration to generate a dense grid of young supernova remnant models based **MESA** progenitors.

- Calibrated model SNe to align yields with literature.
- Modeled CSM based on stellar mass-loss rates.
- Examined variation of broadband X-ray emission due to progenitor evolution.
- Examined absorption due to line-of-sight effects in the early remnant.

### BROADBAND MODELING OF GRB AFTERGLOWS

| GRADUATE RESEARCH ASSISTANT

Aug 2016 – Jan 2022 | The George Washington University

Worked with **Dr. Alexander van der Horst** and **Dr. Paz Beniamini** to model a large and diverse sample of GRB afterglows using our modified version of **boxfit**, a tool that generates lightcurves and spectra from numerical radiation calculations performed on a two-dimensional astrophysical jet model. Publication in prep.

- Modeled 13 *Swift* triggered GRBs with radio detections (ongoing).
- Examined the effect SSC modifications had on derived microphysical parameters.

### NUMERICAL MODELING OF GRB AFTERGLOW EMISSION

| GRADUATE RESEARCH ASSISTANT

Jan 2017 – Jan 2022 | The George Washington University

Worked with **Dr. Alexander van der Horst** and **Dr. Paz Beniamini** to understand the theoretical basis for introducing Synchrotron Self-Compton scattering to **boxfit** in a computationally efficient manner. Publication in review.

- Performed mathematical derivation of Inverse-Compton parameter beyond what currently appears in the literature.
- Developed smoothed approximation to SSC parameter,  $Y'$  for implementation in **boxfit**.
- Expanded SSC implementation to include effects due to Klein-Nishina suppression of the SSC cooling.

## **SIMULATING SCALAR FIELD THEORIES ON THE LATTICE | RESEARCH ASSISTANT**

May 2016 – Dec 2016 | The George Washington University

Worked under **Dr. Andrei Alexandru** to simulate a scalar field with a quartic interaction on a D+1-dimensional lattice.

- Implemented Metropolis based Monte Carlo methods to walk through the configuration space of the particle as a precursor to a more robust study of symmetry breaking with respect to the Path Integral sign problem.
- Performed Lattice regulated perturbation calculations to verify numerical results from the theory.

## **ACTIVITY-CYCLE VIABILITY STUDY OF NGC 6811 | SENIOR RESEARCH ASSISTANT**

May 2014 – Sept 2014 | Gettysburg College

Worked under **Dr. Jacquelynne Milingo** to perform V Band differential Photometry on cool dwarf stars in NGC 6811.

- Utilized Lomb-Scargle period finding routines to extract magnitude and rotational period data for these stars as part of an activity-cycle viability study.
- Collected data utilizing The National Undergraduate Research Observatory 0.8m telescope in Flagstaff AZ.
- Presented results as a poster at Gettysburg College Fall Honors day.
- Precursor work for my Senior **Thesis**.

## **OBSERVING AND ASTROMETRY WITH NURO | RESEARCH ASSISTANT**

Jan 2012 – May 2012 | Gettysburg College

Worked under **Dr. Laurence Marschall** to conduct observations utilizing the National Undergraduate Research Observatory 0.8m telescope.

- Collected data of cool dwarfs in M45 for use in an ongoing activity-cycle study.
- Performed differential photometry on these frames, and on images of two asteroids: Weismann and UETA.
- Fit sinusoids to the asteroid lightcurves to determine rotational periods.

## **TEACHING**

### **TEACHING ASSISTANT | ASTRONOMY 1001 AND 1002 SCALE-UP**

Jan – May: 2016, 2017, 2018 | Gettysburg College

- Helped conduct class sessions by preparing activity and workbook materials.
- Led discussions during class and queried students about their understanding during group activities.
- Circulated among the students to answer questions as needed.
- Assisted in proctoring exams, and graded all workbooks, lab reports and midterms.

### **LABORATORY INSTRUCTOR | ASTRONOMY 1001 AND 1002**

Aug – Dec: 2015, 2016, 2017. Jan – May: 2016 | The George Washington University

- Prepared quizzes and instructed astronomical laboratory sections in conjunction with the lecture component of the course.
- Actively answered questions that arose during the laboratory sessions and attempted to connect material to main course wherever possible.
- Graded lab reports and proctored and graded all examinations.

### **LABORATORY INSTRUCTOR | PHYSICS 1021 AND 1012**

May 2017 – Sept 2017 | The George Washington University

- Prepared quizzes and instructed laboratory and recitation sections in conjunction with the lecture component of the course.
- Actively answered questions that arose during the laboratory sessions and attempted to connect material to main course wherever possible.
- Graded labwork, homework, quizzes and exams.
- Held regular office hours to further facilitate student comprehension.

### **PEER LEARNING ASSOCIATE | DIFFERENTIAL EQUATIONS**

Aug 2014 – May 2015 | Gettysburg College

- Organized and held drop-in hours for students seeking help on Matlab based differential equations projects and LaTeX based reports.

### **PEER SCIENCE MENTOR | ASTRONOMY 101 AND 102**

Aug 2013 – May 2015 | Gettysburg College

- Organized and led homework and exam review sessions for students in both sections of Introductory Solar System and Stellar astronomy classes.

### **UNDERGRADUATE LABORATORY TEACHING ASSISTANT | ASTRONOMY 101 AND 102**

Aug 2013 – May 2015 | Gettysburg College

- Assisted Laboratory instructor in preparing and leading CLEA experiments in astronomy.
- Setup and operated telescopes and CCD cameras for observing laboratory sessions.

## PROFESSIONAL SOCIETIES

Sept 2018-Present    American Astronomical Society  
May 2015-Present    Sigma Pi Sigma  
May 2014-Present    American Physical Society

## WORKSHOPS

Jan 2021, 2022    Harvard ComputeFest  
Aug 2020    Eighth AtomDB Workshop  
Aug 2019    MESA Summer School  
Jan 2019    Adding LISA to your Astronomy Tool Box  
Jan 2019    LSST Science Pipelines Stack Tutorial for AAS

## PUBLICATIONS

### 2021

**Taylor E. Jacovich**, Paz Beniamini, and Alexander J. van der Horst. Modeling Synchrotron Self-Compton and Klein-Nishina effects in Gamma-Ray Burst afterglows. *Monthly Notices of the Royal Astronomical Society*, April 2021.

**Taylor Jacovich**, D. Patnaude, C. Badenes, S. H. Lee, P. Slane, S. Nagataki, and D. Milisavljevic. Absorption And X-Ray Luminosity in Young Remnants. *Submitted*, November 2021.

**Taylor Jacovich**, D. Patnaude, C. Badenes, S. H. Lee, P. Slane, S. Nagataki, and D. Milisavljevic. Doppler Broadening and Line-of-Sight Effects in Core-Collapse Supernovae and Young Remnants. *Submitted*, 2021.

**Taylor Jacovich**, Daniel Patnaude, Patrick Slane, Carles Badenes, Shiu-Hang Lee, Shigehiro Nagataki, and Dan Milisavljevic. A Grid of Core-collapse Supernova Remnant Models. I. The Effect of Wind-driven Mass Loss. *The Astrophysical Journal*, 914(1):41, June 2021.

## PRESENTATIONS AND PROCEEDINGS

### 2021

**Taylor Jacovich**. Examining The Outflows of High Energy Stellar Explosions. In *American Astronomical Society Meeting Abstracts*, volume 53 of *American Astronomical Society Meeting Abstracts*, page 509.02D, January 2021. Dissertation Talk.

**Taylor Jacovich**, D. Patnaude, C. Badenes, S. H. Lee, P. Slane, S. Nagataki, and D. Milisavljevic. Emission and Absorption in Core-Collapse Supernova Remnant Models: The Effect of Wind-Driven Mass-Loss. In *43rd COSPAR Scientific Assembly*, volume 43, January 2021. Poster Presentation.

**Taylor Jacovich**, D. Patnaude, C. Badenes, S. H. Lee, P. Slane, S. Nagataki, and D. Milisavljevic. Exploring The Parameter Space of High Energy Stellar Explosions. In *CHASC Seminar*, March 2021. Invited Talk.

### 2019

**Taylor Jacovich**, D. Patnaude, C. Badenes, S. H. Lee, P. Slane, S. Nagataki, D. Milisavljevic, and D. Ellison. A Grid of Core Collapse Supernova Remnant Models Evolved from Massive Progenitors. In *Supernova Remnants: An Odyssey in Space after Stellar Death II*, page 81, Jun 2019. Poster Presentation.

**Taylor Jacovich**, D. Patnaude, C. Badenes, S. H. Lee, P. Slane, S. Nagataki, D. Milisavljevic, and D. Ellison. A Grid of Core Collapse Supernova Remnant Models Evolved from Massive Progenitors. In *Collaborative Meeting on Supernova Remnants between Japan and USA*, Nov 2019. Invited Talk.

**Taylor E. Jacovich**, Alexander J. van der Horst, and Paz Beniamini. Beyond Synchrotron Effects in Gamma-Ray Burst Afterglows. In *American Astronomical Society Meeting Abstracts #233*, volume 233 of *American Astronomical Society Meeting Abstracts*, page 248.01, Jan 2019. Poster Presentation.

**Taylor E. Jacovich**, Alexander J. van der Horst, and Paz Beniamini. Synchrotron self-Compton Effects on Afterglow Modeling. In *Yamada Conference LXXI: Gamma-ray Bursts in the Gravitational Wave Era 2019*, Oct 2019. Contributed Talk.

## 2014

**Taylor Jacovich**, M. Hill, A. Krehbiel, and J. Milingo. Search for Starspots in NGC 6811. In *Gettysburg College Fall Honors Poster Session*, Oct 2014. Poster Presentation.

**Taylor Jacovich**, J. Milingo, M. Hill, and A. Krehbiel. Activity Cycle Viability of KIC Stars in NGC 6811. In *Gettysburg College Senior Capstone Presentation*, Dec 2014. Capstone Presentation.

## 2012

**Taylor Jacovich**, L. Marschall, and A. Palmisano. Photometry of Rotating Asteroids at NURO. In *Central Pennsylvania 32nd Annual Astronomers' Meeting*, March 2012. Poster Presentation.