

# Nikolaus Zen Prusinski

3687 S. Kinnickinnic Ave.  
Saint Francis, WI 53235

(414) 727-0866  
nik@nzp.guru  
<http://nzp.guru/>

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## EDUCATION

### University of Wisconsin - Milwaukee, Milwaukee, WI

*Bachelor of Science*, Physics - Astronomy Emphasis, 2016 - Date

*Bachelor of Science*, Mathematics, 2016 - Date

Full time University Student since Fall 2016 (age 15) pursuing Astrophysics, Mathematics, and Music. Dean's Honor List 6/7 semesters, averaging 17-21 credits per semester. Current GPA: 3.937. Expected Graduation May 17, 2020.

### Saint Francis High School, Saint Francis, WI

Finished High School campus work in two years (age 13 - 15) 2014 to 2016. Diploma conferred June, 2018; Valedictorian - Egregia Cum Laude.

Emphasis in Science, Math, Robotics, and Music at the Honors/AP level. Gifted and Talented Program, Board Sponsored Youth Options. Started College at age 15 (2016) at University of Wisconsin - Milwaukee. First in class rank with 4.548 GPA.

## RESEARCH EXPERIENCE

### Northwestern University

Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA)

Nancy Aggarwal, Christopher Berry, Aaron Geller; Summer 2019 NSF REU

Research Project: Detecting Orphan Memory from Gravitational Waves

- Worked in the Northwestern LIGO group studying the Levitated Sensor Detector's (LSD's) gravitational wave detection capabilities.
- Extended previous order of magnitude work on the LSD by estimating signal-to-noise ratios (SNRs) for both the memory and oscillatory components of a high frequency gravitational wave signal.
- Investigated the possibility of future orphan memory detections in LIGO for contrived GW bursts.

### University of Wisconsin - Milwaukee

Center for Gravitation, Cosmology, and Astrophysics (CGCA)

Prof. Dawn Erb, Summer 2017 - Date

Research Project: Galactic Star Formation Driven Outflows at  $1 < z < 1.5$

- Used data from the *Hubble* and Keck telescopes to study the connection between star formation and galactic-scale outflows of gas.
- Reduced data using *Grizli*, a newly-developed python pipeline, and made maps of the H $\alpha$  emission line for galaxies of interest.
- Designed code to determine areas, star formation rates, and SFR surface densities for each of the galaxies.

### University of Wisconsin - Milwaukee

Center for Gravitation, Cosmology, and Astrophysics

Prof. David Kaplan, 2016 - 2017

- Worked with group of undergraduate students through the Arecibo Remote Command Center at UWM (ARCC@UWM) to detect pulsars.

- Classified output of pulsar search pipeline, using Pulsar Exploration and Search Toolkit (PRESTO) plots, to determine if new pulsar had been found.
- Conducted remote observations from UWM with the Arecibo Observatory in Puerto Rico and Green Bank Telescope in West Virginia, collaborating with other institutions around the country.

### **University of Wisconsin - Milwaukee**

Hand Rehabilitation Laboratory

Dr. Na Jin Seo, 2012 - 2014

Designed, built, and programmed “Towerbot” Digital Filament Stimulator integral to Stroke Patient nerve regeneration. Worked with Dr. Na Jin Seo’s team including Dr. Pilwon Hur, Dr. Greg Slota, and Kishor Lakshminarayanan over two years as special collaborator. Acknowledgment in final paper.

### **SYMPOSIUM**

**Nikolaus Prusinski**, Dawn K. Erb, Crystal L. Martin. “*Galactic Outflows and the Morphology of Star Formation at  $1 < z < 1.5$* .” Poster presentation at 235<sup>th</sup> American Astronomical Society (AAS) Meeting. January 6, 2020. Honolulu, HI.

**Nikolaus Prusinski**, Nancy Aggarwal, Christopher Berry. “*Detecting Orphan Memory from Gravitational Waves*.” Poster presented at Adler Planetarium to general public. August 23, 2019. Chicago, IL.

**Nikolaus Prusinski**, Nancy Aggarwal, Christopher Berry. “*Detecting Orphan Memory from Gravitational Waves*.” Poster presented at Northwestern to CIERA physics/astro faculty, students, and staff. August 22, 2019. Evanston, IL.

**Nikolaus Prusinski**, Dawn K. Erb, Crystal L. Martin. “*Galactic-Scale Star Formation-Driven Outflows at  $1 < z < 1.5$  in the 3D-HST Survey*.” Poster presented at 11th annual UWM Undergraduate Research Symposium. April 5, 2019. Milwaukee, WI.

**Nikolaus Prusinski**, Dawn K. Erb, Crystal L. Martin. “*Galactic-Scale Star Formation-Driven Outflows at  $1 < z < 1.5$  in the 3D-HST Survey*.” Poster presented at 10th annual UWM Undergraduate Research Symposium. April 27, 2018. Milwaukee, WI.

### **RESEARCH FELLOWSHIPS**

#### **Senior Excellence in Research Award (SERA)**

Awarded for 2019-2020 Academic Year to continue research with Prof. Dawn Erb on star formation and galactic outflows.

One of seven UWM students chosen to serve as ambassador for undergraduate research. Presented work and experiences to local high school students and community members.

#### **Northwestern University - Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA)**

2019 Summer Researcher through NSF REU program (see research website).

#### **Support for Undergraduate Research Fellows (SURF) Grants**

Awards for: 2017-2018 Academic Year, Summer 2018, 2018-2019 Academic Year, Summer 2019

Poster Presentations at 2018, 2019 UWM Undergraduate Research Symposia.

## **GRANTS and SCHOLARSHIPS**

James M. Martin Memorial Scholarship - for having the highest overall score in Modern Physics class - 2019  
Chancellor Award - for academic excellence - 2018, 2019  
Wisconsin Space Grant Consortium (WSGC) Undergraduate Scholarship - 2018, 2019  
Academic Excellence Scholarship - 2018, 2019  
Hoye Scholarship - 2018  
William L Walters Memorial Scholarship - 2018  
Trustone Financial Scholarship - 2018  
Saint Francis Civic Association Scholarship - 2018  
UWM Manfred Olson Planetarium Scholarship - 2017  
Joseph (Starr) Diny Scholarship - 2017

## **HONORS and AWARDS**

National Society of Academic Excellence Nomination - 2019  
National Society of Collegiate Scholars Nomination - 2019  
William Lowell Putnam Mathematical Competition Participant - 2017 - 2019  
Member UWM Honors College - 2017 - 2019  
Junior Honor Court, Saint Francis High School; June, 2017; Valedictorian.  
High Honor Roll - First in Class 4.548 GPA - 2014 - 2018  
National Academy of Future Scientists and Technologists Award of Excellence Nomination - 2016  
Named AP Scholar based on scores in AP classes, namely, AP Computer Science A, AP U.S. History, and AP Spanish Language and Culture (2015, age 14).  
FIRST FTC Inspire Award - for Robotic Programming and Sensor Integration - 2015  
MENSA International Invitation - 2013  
USFIRST Certificate of Appreciation - for Inspiring Youth STEM - 2011 - 2013

## **TEACHING EXPERIENCE**

### **University of Wisconsin - Milwaukee**

Supplemental Instruction (SI) Leader through the Student Success Center (SSC) at UWM. Tutoring calc-based E&M. - Fall 2019

- Received CRLA's International Tutor Training Program Certification (Level 1)
- Certificate of Appreciation from the SSC for Tutoring and SI during Fall semester

### **Saint Francis High School**

Tutor in RobotC, Java, C++, Python, Math, and Music; individually and in small groups.

### **Deer Creek Intermediate School**

Lecturer - RobotC Programming Movement and Sensor Integration (FTC) - 2013 - 2014  
Developed Syllabus and Course Materials (PPT and MPG/AVI multimedia)

Instructor - FIRST FLL Mindstorms 2 Programming 4<sup>th</sup> - 8<sup>th</sup> Grade Students - 2013  
Developed Course(s) with 8<sup>th</sup> Grade Science Teacher (Mr. Peter Graven), presenting during school year and summer programs.

Demonstrator/Instructor - Zen42 Tetrix Sensor Robot - 2012 - 2015

Design, Build, Program, and Present robots at Public Shows/Displays; Public Library Demonstrations; G. E. Campus, Waukesha, WI for Scouts and General Public; St. Francis Middle and High Schools; and East Troy High School. Search "Zen42" on

YouTube for examples.

## OUTREACH

### UWM Manfred Olson Planetarium - 2015 - Date

- Conduct weekly stargazing sessions at the UWM observatory. When cloudy, present live shows inside the planetarium on constellations, current astronomy news, and specific astronomical topics (e.g. black holes, birth of the universe, etc.).
- Fulfilled an opportunity as project lead to improve the UWM observatory to feature a 14" reflecting telescope on a permanent computerized mount with astrophotography capabilities using a CCD camera.
- This \$18,500 project required sourcing telescope equipment, putting together the mount, and coordinating with university faculty and staff both in and outside of physics.
- Project's success mandated training and mentoring my replacements using the upgraded scope. Currently working with a student to observe transiting exoplanets using the CCD camera as part of an independent study research project.

### UWM Astronomy Club - 2016 - Date

- Presentations to physics undergrads on personal research projects and current astro news
- Astronomy public outreach: Maker Faire Milwaukee (2019), Human Scale Sundial Project (2017), "Coffeeshop" Astrophysics (2017)

## MEDIA and COMMENTARY

### University of Wisconsin - Milwaukee - 2015 - Date

"Changes at Yerkes Observatory, An Artifact of Wisconsin's Astronomical Glory Days," WUWM 89.7 - March 12, 2018

### Manfred Olson Planetarium - Stargazing Group Leader

- Planetarium Website Cover Piece and Bio - November 8, 2016
- CBS Channel 58 News Interview - 2017
- Research Demonstration with CCD Camera Measuring Linearity, Read Noise, and Gain (paper) - July 10, 2017

**Website:** <http://nzp.guru/> Create, design, produce, and publish text and video on to private/public servers and YouTube. Publish to share research activities, programming references, and recreational interests. - 2008 - Date

## COMPUTER SKILLS

**Languages:** Python, Java, C, C++, Swift, L<sup>A</sup>T<sub>E</sub>X.

**Web Development:** HTML, CSS.

**Applications:** Mathematica, DS9, Dreamweaver, Photoshop, PTC Creo, Autodesk Inventor, SolidWorks, MS/Apple Office Suites, Xcode, Finale.

**Operating Systems:** Linux/Unix, Mac OS, Windows, iOS, Android.

**MEMBERSHIPS,  
INTERESTS, and  
VOLUNTEERING**

American Astronomical Society (AAS) Undergraduate Member - 2019 - Date  
UWM Chancellor Recognition for Public Telescope Viewing during Solar Eclipse - 2017  
UWM Astronomy Club - 2015 - Date  
UWM Planetarium Stargazing Lead - 2015 - Date  
UWM Center for Gravitation, Cosmology, and Astrophysics (CGCA) - 2016 - Date

**Federal Aviation Administration (FAA) Private Pilot** - Single Engine Land Aircraft - 2018 - Date

- FAA Student Pilot - Instrument Single and Multi-Engine Land - 2012 - Date
- Soloed at 16, Licensed at 17 (FAA Age Minimums) - Flying since 2007

Experimental Aviation Association (EAA) Member - 2019 - Date

**Musician** (Orchestra Student) - **French Horn, Piano, and Trumpet** - 2008 - Date

Horn Participant: UWM Horn Choir, UWM Symphony Band, UWM University Community Orchestra, Milwaukee Municipal Orchestra - 2016 - Date

Great Lakes Sailor - Helm, Nav, and Sheet Masthead Sloop "Paprika" - 2010 - Date