Christian Norseth

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Education

Ph.D Physics (In Progress) Aug 2025 - May **2028 (Expected)**
University of Utah, Salt Lake City, UT

M.Sc. Physics Aug 2023 - Aug **2025**
University of Utah, Salt Lake City, UT

B.Sc. Physics, Emphasis in Astronomy Aug 2017 - Dec **2021**
University of Utah, Salt Lake City, UT

Publications

Timer, A., **Norseth, C. T.**, Wik, D. R., "X-Ray Evidence from NuSTAR for a Mach 3 Shock in Merging Galaxy Cluster ZWCL 1856.8", 2026, ApJ, 243, 1003

Norseth, C. T., Wik, D. R., Sarazin, C. L., Sun, M., Gastaldello, F., "Electron-Ion Equilibration in the Merging Galaxy Cluster A665", 2025, ApJ, 62, 992

Dhileepkumar, S., Wik, D. R., **Norseth, C. T.**, "Do Electrons Ghost Ions After a Merger?: A NuSTAR Investigation of Intracluster Plasma in Abell 2146", 2025, RANGE: Undergraduate Research Journal, University of Utah, 26, 2, 83

Norseth, C. T., Wik, D. R., ZuHone, J. A., Miller, E. D., Bautz, M. W., McDonald, M., "Gas Clumping in the Outskirts of Galaxy Clusters: An Assessment of the Sensitivity of STAR-X", 2023, RASTI, 2, 607

Research Experience

Graduate Research Assistant

Aug 2023 – Present

PI: Dr. Daniel Wik
University of Utah

- **X-ray Cross-Calibration** (2025 - Present)
  - ***Thesis project***
  - **Processed 182 observations of 36 galaxy clusters (9.1 Ms of data)**
  - Spatially characterized 12 clusters in extreme detail
  - Studying the effect of instrumentation on galaxy cluster temperature measurements

- **RX J1347** (2026 - Present)
  - ***Project lead***
  - Full spatial characterization of galaxy cluster emission
  - Investigating potential IC emission in a cluster merger

- **Abell 754** (2026 - Present)
  - ***Drafted first author paper***
  - Spatially characterized in detail
  - Exploring shock strength and equilibration models in the cluster merger A754

- **MACS J1752** (2026 - Present)
  - ***Project lead***
  - Will perform full spatial characterization of cluster emission
  - Investigating potential IC emission in a cluster merger
  - Followup to ZWCL 1856

- **XRISM Cross Calibration w/ Abell 2029** (2024 - Present)
  - ***Collaborator***
  - Understanding cross-calibration between XRISM (XTend and Resolve) and NuSTAR
  - Processed and analyzed NuSTAR data

- **PHEMTO Core Member** (2026)
  - ***Mission concept proposal***: The Polarimetric High Energy Modular Telescope Observatory
  - Simulated temperature profile across shock front in A665 and impact on equilibration models
  - Contributed to proposal, presented at X-Ray Universe

- **Double Radio Relic Galaxy Cluster ZWCL+1856** (2024 - 2026)
  - ***Published second author paper***
  - Remote/Visiting Collaboration with MIT Kavli Institute for Astrophysics and Space Research (PI: Dr. Aysegül Tümer)
  - Investigated IC and B field strength in galaxy cluster merger
  - Visited MIT May 2024

- **Equilibration in Galaxy Cluster Merger Abell 665** (2023 - 2025)
  - ***Published first author paper***
  - Conducted detailed temperature analysis across shock front
  - Derived shock heating models for electron-ion equilibration

Post-Bacc/Undergrad Research Assistant Mar 2021 – Aug 2023
PI: Dr. Daniel Wik
University of Utah

- **STAR-X Gas Clumping Simulations** (2021 - 2023)
  - ***Published first author paper***
  - Assessed sensitivity of STAR-X, a NASA MIDEX probe in phase A study
  - Constructed simulations and analysis pipelines
  - Simulated gas clumping in galaxy cluster outskirts

Conferences & Presentations

AAS 248 Jun 2026
Pasadena, CA
"Galaxy Cluster Thermalization" (Talk)
Norseth, C. T., Wik, D. R., Sarazin, C., Sun, M., Gastaldello, F.

The X-ray Universe 2026 Jun 2026
Elche, Spain
"Galaxy Cluster Thermalization" (Talk)
Norseth, C. T., Wik, D. R., Sarazin, C., Sun, M., Gastaldello, F.

Magnetic Fields and Cosmic Rays across Diverse Scales: What's Next? Sep 2025
Harvard & Smithsonian Center for Astrophysics, Cambridge, MA
"Electron-Ion Equilibration in the Merging Galaxy Cluster Abell 665" (Poster/Flash Talk)
Norseth, C. T., Wik, D. R., Sarazin, C., Sun, M., Gastaldello, F.

SWIGART Summer Research Program Oct 2024
University of Utah, Salt Lake City, UT
"Galaxy Cluster Merger Thermalization Timescales" (Flash Talk)
Norseth, C. T., Wik, D. R

HEAD Meeting of the AAS Mar 2023
Kona, HI
"The Unseen: Gas Clumping in The Outskirts of Galaxy Clusters" (Poster)
Norseth, C. T., Wik, D. R, ZuHone, J. A., Miller, E. D., Bautz, M. W.

AAS Jan 2023
Seattle, WA
"The Unseen: Gas Clumping in The Outskirts of Galaxy Clusters" (Poster)
Norseth, C. T., Wik, D. R, ZuHone, J. A., Miller, E. D., Bautz, M. W.

HEAD meeting of the AAS Mar 2022
Pittsburgh, PA
"The Unseen: Gas Clumping in The Outskirts of Galaxy Clusters" (Poster)
Norseth, C. T., Wik, D. R

Undergraduate Research Symposium Aug 2021
University of Utah, Salt Lake City, UT
"The Unseen: Gas Clumping in The Outskirts of Galaxy Clusters" (Poster)
Norseth, C. T., Wik, D. R

Successful Observing and Funding Proposals

- **PI**, 2026: *Graduate Student Travel Grant*, Department of Physics and Astronomy, University of Utah, $1250
- **PI**, 2026: *NuSTAR*, "3C 438: Constraining a Shock in one of the Hottest Clusters in the Universe," 300 ks, (Budget PI: Daniel Wik) - C priority
- **Co-I**, 2026: *XRISM*, "Turbulence and Accurate Temperatures in Abell 2204," 250 ks (PI: Daniel Wik) - C priority
- **Co-I**, 2026: *XRISM*, "CL 0217+70: The First XRISM Look at a Galaxy Cluster Merger Shock," 310 ks (PI: Aysegül Tümer) - C priority
- **Co-I**, 2026: *NuSTAR*, "Shock Front and Inverse Compton Search Across the Double Radio Relics of MACS J1752.0+4440," 200 ks (PI: Aysegül Tümer) - B priority
- **Co-I**, 2026: *NuSTAR*, "Triangulum Australis: Uncovering a Merger in an Obscure(d) Galaxy Cluster," 125 ks (PI: Daniel Wik) - B priority
- **Co-I**, 2025: *NuSTAR*, "Hot Gas, Hydrostatic Mass, and Inverse Compton Constraints in Abell 1914 & Abell 1689," 220 ks, C priority (PI: Daniel Wik)
- **Co-I**, 2024: *ADAP*, "X-ray Cross-calibration and the Impact on Cluster Cosmology," $449,098 (PI: Daniel Wik)
- **Co-I**, 2024: *XRISM*, "Gas Dynamics in the Line-of-Sight Merger Abell 2163 with XRISM," 200 ks, $176,173 (PI: Daniel Wik)

Research Supported by:
NASA NuSTAR GO Grant NNX17AH31G (PI: Daniel Wik)
NASA NuSTAR GO Grant NNH22ZDA001N (PI: Aysegül Tümer)

Service and Teaching Experience

Webmaster/Board Member Mar 2026 - Present
Great Salt Lake Audubon
Salt Lake City, UT
- Update and maintain website for non-profit organization
- Attend board meetings and discuss upcoming events

AstroCoffee (Journal Club) Organizing Committee Member Mar 2026 - Present
University of Utah
Salt Lake City, UT
- Assist in the organization and facilitation of a journal club

Science Fair Mentor Aug 2023 - Present
Science With U
University of Utah, Salt Lake City, UT
- Mentor middle school students with their science fair projects

Teaching Assistant (TA) Jan 2023 - Dec 2024
University of Utah
Salt Lake City, UT
- Physics for Scientists and Engineers II (PHYS 2220)

Astrophysics Intern Summer 2022
Evans and Sutherland (E&S)
Salt Lake City, UT
- Designed and scripted planetarium shows using astronomical datasets in the Digistar Command Language

Thing Tank Contributor Spring 2018
Spark Lab
University of Utah, Salt Lake City, UT
- Assessed how to improve the accessibility of information at the University of Utah Hospital Burn Unit

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