

Postdoctoral Fellow
Washington University in St. Louis
Department of Physics
One Brookings Drive
242 Compton Hall
St. Louis, MO 63130
USA

Home Address*
John Mehlhaff
11 Square le Périer
38400 Saint-Martin-d'Hères
France

Personal
U.S. Citizen

Contact
USA: +1 (206) 962-9335
France: +33 7 67 17 45 29
mehlhaff@wustl.edu

EDUCATION

University of Colorado, Boulder, CO

M.S. Physics, 2019

Ph.D. Physics, 2021

Thesis: *Magnetic Reconnection and the Extreme Plasmas of Blazar Jets*

Advisor: Dmitri Uzdensky; Co-advisors: Mitchell Begelman & Gregory Werner

University of Washington, Seattle, WA

B.S. Physics, Computer Science, 2016

Summa cum laude

RESEARCH INTERESTS

- Black hole magnetospheres, jets (esp. blazars), accretion disks, coronae
- Connecting first-principles plasma processes to black hole observations
- Compact-object binaries and their multi-messenger signals
- High-energy astrophysical plasmas
 - ★ Kinetic aspects of particle acceleration and angular momentum transport
 - ★ Regimes of strong gravity and radiation (involving GR and QED)
- Computational methods
 - ★ Electromagnetic particle-in-cell codes and their algorithms
 - ★ Methods for massively parallel high-performance computing

EMPLOYMENT HISTORY

Dates	Institution; Location	Description
2025-now	Washington University in St. Louis; St. Louis, MO, USA	SCEECS Postdoctoral Fellow in the Y. Yuan and A. Chen group.
2021-2025	Univ. Grenoble Alpes, CNRS , IPAG ; Grenoble, France	Postdoctoral Researcher in the group of B. Cerutti .
2017-2021	University of Colorado; Boulder, CO, USA	Ph.D. student of D. A. Uzdensky . Co-advised by M. C. Begelman and G. R. Werner .
2014-2015	University of Washington; Seattle, WA, USA	Research assistant to G. F. Bertsch .
2014	Jet Propulsion Laboratory; Pasadena, CA, USA	Intern to A. Romero-Wolf .
2011-2013	University of Washington; Seattle, WA, USA	Research assistant to E. Agol and A. Becker . Wrote software to detect new exoplanets in Kepler Space Telescope data.

*Electronic communication preferred, but if mail is necessary, please use home address.

SEMINARS, CONFERENCES, AND WORKSHOPS (RECENT EXAMPLES)

Date	Contribution	Location	Conference Name
Aug.-Sep. 2025	Program participant	KITP ; Santa Barbara, CA, US	Relativistic Plasma Physics: From the Lab to the Cosmos
June 2025	Invited review	Sorbonne University; Paris, France	Kinetic Physics of Astrophysical Plasmas
May 2025	Invited seminar	Oxford University; Oxford, UK	Oxford Plasma Theory Group Seminar
Apr. 2025	Contributed talk	Les Houches Physics School; Les Houches, France	Feeling the Pull and the Pulse of Relativistic Magnetospheres
Feb. 2025	Contributed poster	Flatiron Institute; New York, NY, US	SCEECS Annual Meeting

COMPUTING PROPOSALS

Date	Awarded Allocation	Description
Aug. 2025	25000 node-hours	Led OLCF Director's Discretion allocation on kinetic black hole accretion
July 2024	7 million core-hours	Co-PI of ACCESS allocation on radiative magnetic reconnection
June 2023	5 million core-hours	Co-PI of ACCESS allocation on radiative magnetic reconnection
June 2022	8 million core-hours	Co-PI of XSEDE allocation on radiative magnetic reconnection

TEACHING

Course (Course Level: <u>U</u> ndergraduate/ <u>G</u> raduate)	Role	Number of student-facing hours (Rounded to nearest 10)
Plasma Physics (G)	Grader	N/A
Mathematical Methods (G)	Grader	N/A
Mechanics (U)	Teaching Assistant	50
E&M (U)	Teaching Assistant	60

SERVICE AND OUTREACH

Dates	Description
2020-now	Referee for The Astrophysical Journal.
Oct. 2025	Public astrophysics outreach (in French) at a local Science Festival (Fête de la Science).
2023-2024	Part of the IPAG colloquium organizing team.
Dec. 2022	Mentored middle school students (in French) during a week-long internship where the students explored careers in astrophysics and conducted scientific projects.
Nov. 2022	Part of the scientific organizing committee for the annual IPAG high-energy astrophysics retreat.

AWARDS

Award Years	Award Title	Awarding Body
2014-2015	Astronaut Scholarship	Astronaut Scholarship Foundation
2015	Andersen Scholarship	University of Washington Physics Department
2011-2015	Space Grant Scholarship	Washington NASA Space Grant Consortium

SKILLS

PIC Codes: ZELTRON, APERTURE

Computer Languages: Python, Fortran 90, \LaTeX , C/C++, Java

Human Languages: English (native), French (estimated CEFR level C1)

- Mehlhaff J.**, Crinquand B., Cerutti B., *A kinetic model of jet-corona coupling in accreting black holes*, [A&A](#), 701, A62
- Mehlhaff J.**, Zhou M., Zhdankin V., *Radiative Relativistic Turbulence as an In Situ Pair-plasma Source in Blazar Jets*, [ApJ](#), 987, 159
- Figueiredo E., Cerutti B., **Mehlhaff J.**, Scepi N., 2024, *Composition-asymmetric and sheared relativistic magnetic reconnection*, [A&A](#), 690, A389
- Mehlhaff J.**, Werner G., Cerutti B., Uzdensky D., Begelman M., 2024, *Kinetic simulations and gamma-ray signatures of Klein-Nishina relativistic magnetic reconnection*, [MNRAS](#), 527, 11587
- Mehlhaff J. M.**, Werner G. R., Uzdensky D. A., Begelman M. C., 2021, *Pair-Regulated Klein-Nishina Relativistic Magnetic Reconnection with Applications to Blazars and Accreting Black Holes*, [MNRAS](#), 508, 4532
- Mehlhaff J. M.**, Werner G. R., Uzdensky D. A., Begelman M. C., 2020, *Kinetic Beaming in Radiative Relativistic Magnetic Reconnection: A Mechanism for Rapid Gamma-Ray Flares in Jets*, [MNRAS](#), 498, 799
- Bertsch G. F., **Mehlhaff J. M.**, 2016, *A Finite-Temperature Hartree-Fock Code for Shell-Model Hamiltonians*, [Comput. Phys. Commun.](#), 207, 518