

Christine F. Waigl

Curriculum Vitae

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Education

- 2017 Ph.D. in geophysics (concentration: remote sensing), University of Alaska Fairbanks
- 1994 Diplom in physics (equiv. to MS), University of Heidelberg, Germany
- 1990 Vordiplom exam in physics, University of Erlangen-Nuremberg, Germany

Appointments

Research

- 2019 - current **Postdoctoral Fellow, Geophysical Institute, University of Alaska Fairbanks**
- Remote sensing of boreal wildfire fuels, fire behavior research, and post-fire land cover mapping within the interdisciplinary Alaska EPSCoR “Fire and Ice” project
 - Implemented processing chain for HySpex aerial hyperspectral imagery with proprietary (ATCOR, PARGE, ENVI) and open-source (Python, Jupyter Notebooks) tools
 - Fieldwork: surveying boreal forest wildfire fuel and GPS locations
 - Designed and implemented fire detection and fire hazard related data services (GDAL, Google Earth Engine, ArcGIS platform)
- 2017 - 2019 **Temporary Research Staff, GI, UAF (part-time)**
- Mapping of low-and high intensity active fire from near real-time satellite detections for public communication (Alaska EPSCoR)
 - WRF-Chem modeling of wildfire smoke and volcanic ash dispersion (Atmospheric Sciences)
 - Fieldwork: surveying boreal forest vegetation
- 2012 - 2016 **Graduate Research Assistant, GI Atm. Sciences & Remote Sensing, UAF**
- Algorithm development: satellite-borne low-intensity fire detection in Alaska boreal forest fires using VIIRS sensor
 - Sub-pixel temperature retrieval and fire detection using Hyperion imaging spectrometer
 - Atmospheric correction of SWIR, MIR, TIR imagery using MODTRAN
 - Machine learning using Random Forest classifiers
 - Fieldwork: aerial survey using FLIR thermal infrared and optical cameras with US Fish and Wildlife Service
 - Coupled atmosphere-fire hazard modeling with WRF-Chem and WRF-Fire on supercomputing environment

- 2011 - 2012 **Research Professional 3, GI, UAF**
- Remote and on-site operations support for DOE Atmospheric Radiation Measurement (ARM) project North Slope of Alaska site (Utqiagvik)
 - Instrument calibration and quality control
 - Developed and deployed new corrective maintenance database software which is now in use nationally across the ARM program
- Summer 2000 **Research Intern, Musée Curie, France**
- Created database of women in Marie Curie's laboratory (FileMaker Pro)
- 1994 - 1995 **Research Assistant, Chemnitz University of Technology, Germany**
- FORTRAN programming and documentation for Monte-Carlo optimization projects
- 1990 - 1991 **Student Assistant, IBM Institute for Supercomputing and Applied Mathematics, Heidelberg, Germany**
- Developed stochastic optimization computer code in FORTRAN

Teaching

- 2018 - 2019 **Adjunct Instructor, College of Natural Science and Mathematics, UAF**
- Fall 2019: NRM F338 "Introduction to Geographic Information Systems"
Fall 2018: GEOS F436/636 "Beyond the mouse: Computer programming and automation for geoscientists"
- 2016 - 2017 **Graduate Teaching Assistant, CNSM, UAF**
- Fall 2016 & Spring 2017: GEOS F120 "Earthquakes, Glaciers, Volcanoes"
- 2013 - 2020 **Guest lectures and short courses, UAF**
- Multiple guest lectures on fire remote sensing and ground-based visible and infrared spectroscopy in:
- GEOS F422 "Geoscience applications of remote sensing"
 - GEOS F458 "Geoscience applications of GPS and GIS"
 - GEOS F654 "Visible and infrared remote sensing"
- October 2015: Co-taught R workshop "Resource Selection Function"
October 2014: Co-taught GIS workshop to Alaska Dept. of Fish and Game
March 2014: Course development "Arctic Natural Hazards" for University of the Arctic. Kick-off workshop Arkhangelsk, Russia
- 2002 - 2004 **Secondary school teacher, Ile-de-France school system, France**
- 1992 - 1994 **Teaching Assistant, U Heidelberg, Germany (calculus, linear algebra, college physics)**

Industry

- 2010 - 2011 **Client Solutions Engineer, Bazaarvoice Inc., London**
- Implemented changes to client-side product deployments (HTML, JavaScript)
 - Quality assurance and project documentation (JIRA, Confluence)

- 2006 - 2010 **Technology Operations Manager/Tech Support Lead, Epsilon, London, UK**
- Owned the investigation and resolution of client issues for SAAS marketing software platform (T-SQL, Python, HTML, HTTP)
 - Line-managed team of 3-8 Technical Support Engineers
 - Managed client-facing and internal technology projects including migrations, data extractions and platform changes (PRINCE II Foundation project management certification)
- 2004 - 2006 **Web developer and online producer, freelance, Paris, France**
- Website development, document management

Student advising - committee membership

- 2020 - now B. Kubby (MS student, geoscience)
- 2020 - now A. Badola (PhD student, geoscience)
- 2013 K. Stilson (summer intern, GIS)
- 2013 A. Ferguson (summer intern, GIS)

Publications

Peer-reviewed articles and book chapters

- Bhatt, U. S., R. T. Lader, J. E. Walsh, P. A. Bieniek, R. Thoman, M. Berman, C. Borries-Strigle, K. Bullock, J. Chriest, M. Hahn, A. S. Hendricks, R. Jandt, J. Little, D. McEvoy, C. Moore, T. S. Rupp, J. Schmidt, E. Stevens, H. Strader, J. White, C. F. Waigl, and A. York (2021). Emerging Anthropogenic influences on the Southcentral Alaska Temperature and Precipitation Extremes and Related Fires in 2019. Manuscript accepted by *Land* for the special issue *Fire in the Earth System: Humans and Nature* (in print).
- Doepper, V., S. Panda, C. F. Waigl, and M. Braun (2021). Using floristic gradient mapping to assess seasonal thaw depth in interior Alaska. *Applied Vegetation Science*. In print. DOI: [10.1111/avsc.12561](https://doi.org/10.1111/avsc.12561).
- Waigl, C. F., A. Prakash, M. Stuefer, D. Verbyla, and P. Dennison (2019). Fire detection and temperature retrieval using EO-1 Hyperion data over selected Alaskan boreal forest fires. *International Journal of Applied Earth Observation and Geoinformation*, vol. 81, pp. 72–84. DOI: [10.1016/j.jag.2019.03.004](https://doi.org/10.1016/j.jag.2019.03.004).
- Starkenburger, D. P., C. F. Waigl, and R. Gens (2018). Chapter 3: Nurturing a Geospatially Empowered Next Generation. In: *Emerging Trends in Open Source Geographic Information Systems*. Ed. by N. N. Srivastava. IGI Global, p. 270. DOI: [10.4018/978-1-5225-5039-6.ch003](https://doi.org/10.4018/978-1-5225-5039-6.ch003).
- Waigl, C. F., M. Stuefer, A. Prakash, and C. Ichoku (2017). Detecting high and low-intensity fires in Alaska using VIIRS I-band data: An improved operational approach for high latitudes. *Remote Sensing of Environment*, vol. 199, pp. 389–400. DOI: [10.1016/j.rse.2017.07.003](https://doi.org/10.1016/j.rse.2017.07.003).
- Waigl, C. F., A. Prakash, A. Ferguson, and M. Stuefer (2015). Chapter 24 - Coal-Fire Hazard Mapping in High-Latitude Coal Basins: A Case Study from Interior Alaska. In: *Coal and Peat Fires: a Global Perspective*. Ed. by E. V. Sokol, G. B. Stracher, and A. Prakash. Vol. 3. Boston: Elsevier, pp. 633–649. DOI: [10.1016/B978-0-444-59509-6.00024-7](https://doi.org/10.1016/B978-0-444-59509-6.00024-7).

Extended abstracts

Stuefer, M., C. F. Waigl, and C. K. Kim (2014). Alaska wildfire observations and near real-time emission modeling with WRF-Chem. In: *Proceedings of the International Smoke Symposium*. International Smoke Symposium. October 21-24, 2013, Hyattsville, Maryland.

PhD thesis

Waigl, C. F. (2017b). *Satellite remote sensing of active wildfires in Alaska's boreal forest*. PhD thesis. Fairbanks, AK, USA: University of Alaska Fairbanks.

Presentations and conferences

Conference talks

Bhatt, U., J. Chriest, C. Borries-Strigle, P. Bieniek, C. F. Waigl, and C. Smith (2020). EPSCoR seasonal forecast and lightning & remote sensing project updates. Talk at the AFSC Spring Fire Science Workshop, Apr 9, 2020.

Waigl, C. F. (2020). Enhancing wildfire resilience in Alaska through landcover mapping with hyper- and multi-spectral remote sensing. Talk at the Tactical Fire Remote Sensing Advisory Committee (TFRSAC) #33 2020 Fall Meeting, Nov 19, 2020 (held remotely).

Waigl, C. F., J. Jenkins, H. Strader, and R. Ziel (2020). Science-to-operations for Alaska wildfire management in times of COVID-19: Usability lessons from rapid data tool development. In: *AGU Fall Meeting Abstracts*. NH036-07. Talk at the 2020 AGU Fall Meeting (held remotely).

Waigl, C. F. (2017a). Improved operational approaches to high- and low-intensity fire detection in Alaska using the VIIRS I-band Fire Detection Algorithm for High Latitudes (VIFDAHL). Talk at the workshop *Opportunities to Apply Remote Sensing in Boreal/Arctic Wildfire Management and Science*, Fairbanks, Alaska, April 5, 2017.

Waigl, C. F., A. Prakash, M. Stuefer, and C. Ichoku (2016). Using NPP-Suomi VIIRS I-band data to delineate high- and low-intensity burn areas for forest fires in interior Alaska. In: *AGU Fall Meeting Abstracts*. GC42C-02. Talk at the 2016 AGU Fall Meeting, San Francisco, CA.

Waigl, C. F. (2015). Data usability in the context of remote sensing data. Talk at the 2015 Summer Meeting of the Federation of Earth Science Information Partners (ESIP), Asilomar, CA, July 15, 2015.

Waigl, C. F. (2014). The Arctic seen from space: Enhancing STEM education with interactive learning. In: Talk at the 2014 Arctic AAAS Meeting, Sep 27, 2014, Fairbanks, AK.

Waigl, C. F., M. Stuefer, G. Grell, and A. Prakash (2013). Refining source input for wildfire emissions forecasts with remote sensing and modeling. Talk at the 2013 ARSC Weather Symposium, Fairbanks, AK.

Selected poster presentations

Badola, A., S. Panda, U. Bhatt, C. Smith, and C. F. Waigl (2020). Simulating AVIRIS-NG Hyperspectral Image from Sentinel-2 Multispectral Image for Improved Wildfire Fuel Mapping, Boreal Alaska. In: *AGU Fall Meeting Abstracts*. NH033-0004. Poster at the 2020 AUG Fall Meeting (held remotely).

Prakash, A., M. Buchhorn, J. Cristobal, R. F. Kokaly, P. R. Graham, C. F. Waigl, D. L. Hampton, M. Werdon, N. Guldager, M. Bertram, and M. Stuefer (2015a). Field-Based and Airborne Hyperspectral Imaging for Applied Research in the State of Alaska. In: *AGU Fall Meeting Abstracts*. GC23K-1233. Poster at the 2015 AUG Fall Meeting, San Francisco, CA.

- Prakash, A., R. Gens, J. Cristobal, C. F. Waigl, M. S. Balazs, P. R. Graham, C. E. Butcher, and E. B. Sparrow (2015b). Using Place-Based Independent Class Projects as a Means to Hone Research Skills and Prepare a Future Geospatial Workforce. In: *AGU Fall Meeting Abstracts*. ED22B-07. Poster at the 2015 AUG Fall Meeting, San Francisco, CA.
- Waigl, C. F., A. Prakash, M. Stuefer, and P. E. Dennison (2014). Fire Characterization and Fire-Related Land Cover Classification Using Hyperion Data over Selected Alaskan Boreal Forest Fires. In: *AGU Fall Meeting Abstracts*. GC33D-0551. Poster at the 2014 AUG Fall Meeting, San Francisco, CA.
- Gens, R., A. Prakash, G. Ozbay, S. Sriharan, M. S. Balazs, A. Chittambakkam, D. P. Starckenburg, C. F. Waigl, S. Cook, A. Ferguson, et al. (2013). A Prototype Two-tier Mentoring Program for Undergraduate Summer Interns from Minority-Serving Institutions at the University of Alaska Fairbanks. In: *AGU Fall Meeting Abstracts*. Vol. 1. ED43B-0768.
- Waigl, C., M. Stuefer, and A. Prakash (2013). Remote sensing of Alaskan boreal forest fires at the pixel and sub-pixel level: multi-sensor approaches and sensitivity analysis. In: *AGU Fall Meeting Abstracts*. B51H-0399. Poster at the 2013 AUG Fall Meeting, San Francisco, CA.
- Waigl, C. F., A. Prakash, and M. Stuefer (2012). Sub-pixel characterization of Alaskan boreal forest fires using medium-resolution satellite-borne infrared remote sensing. In: *AGU Fall Meeting Abstracts*. NH53A-1813. Poster at the 2012 AUG Fall Meeting, San Francisco, CA.
- Waigl, C. F., M. Stuefer, B. Perkins, M. Ivey, J. Zirzow, W. Brower, J. Ivanoff, and C. Stuart (2012). NSA Corrective Maintenance Reporting: A Status Report. In: Poster at the ARM Science Team Meeting, Crystal City, VA, March 15, 2012.

Synergistic activities

Science-to-operations: Created data services ready-to-use by the Alaska Fire Service, including for daily snow cover, fire danger and fire detection data, thereby bridging the gap between research and operational use of scientific products.

Communicating science to the wider public Multiple presentations to K-8 students with the UAF portable planetarium (2015-2017). Wildfire presentation to middle and high school students of the village of Rampart (Nov 8, 2019). Authored article in Fairbanks Daily News-Miner June 30, 2015 ([“Fairbanks geophysics student goes behind the scenes of satellite wildfire mapping”](#)). Work featured in UAF News June 3, 2020 ([“Satellites fill void for wildfire managers amid COVID-19 restrictions”](#)) and the Summer 2020 AFSC Fire Science Highlight ([“EPSCoR Boreal Fires Team: Remote Sensing for Alaska Fire Season”](#))

Strengthening links between academia and open-source software: I have served for multiple years on US Python Convention program committees and spoken at software conferences:
Feb 23, 2019: PyCascades, Seattle, WA: [“Abstraction for Students of All the Things”](#)
May 18, 2017: PyCon US, Portland, OR: [“The Next Step: Finding Model Parameters With Random Walks”](#)
April 26, 2016: OpenVis Conference, Boston, MA: [“Our Planet Seen from Space”](#)
April 18, 2015: PyCon US, Montreal, QC, Canada: [“Satellite Mapping for Everyone”](#)

Service

- Professional** Since 2014, I have been a peer reviewer for the following journals:
- Fire
 - Forests
 - GI Science & Remote Sensing
 - Global Change Biology
 - ISPRS International Journal of Geo-Information
 - Environmental Engineering and Management Journal
- 2017: Member of the organizing committee of the NASA-funded workshop “Opportunities to Apply Remote Sensing in Boreal/Arctic Wildfire Management and Science” organized by the Alaska Fire Science Consortium, Fairbanks, AK, April 3-4, 2017
- University** 2020 - now: UAF GI Diversity, Equity and Inclusion Committee
- Community** 2021 - now: Faculty Advisor for UAF Community Garden

Funding awards

- 2017 CIFAR Follow-Up Funding (PI/Advisor: Martin Stuefer) — \$ 14,046
- 2013 - 2016 NASA Earth and Space Science Fellowship (PI/Advisor: Martin Stuefer) — \$ 90,000
- 2015 Earth Science Information Partners (ESIP) Federation Robert G. Raskin Scholarship — \$ 2,000
- 2014 UAF Center for Global Change/CIFAR Student Award Competition — \$ 9,647.48

Honors

- 2018 UAF Geophysical Institute Best Student Paper Award for Waigl et al., 2017
- 1988 - 1994 German National Merit Foundation (Studienstiftung des deutschen Volkes)
- 1988 - 1994 Scholarship for highly talented students of the state of Bavaria, Germany

Languages

- German (native speaker)
- English (fluent spoken and written)
- French (fluent spoken and written)