# Christine F. Waigl

## Curriculum Vitae

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## Education

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

## Research Experience

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| 2017 - 2018 | Temporary Research Staff (part-time), Geophysical Institute (GI), UAF |
| 2012 - 2016 | Graduate Research Assistant, UAF GI |
| 2011 - 2012 | Research Professional 3, UAF: Atmospheric Radiation Measurement (ARM) project North Slope of Alaska (site operations and software development) |
| 2000, Summer | Research Intern (history of science), Musée Curie, Paris, France |
| 1994 - 1995 | Research Assistant (stochastic optimization), Chemnitz University of Technology, Germany |
| 1990 - 1991 | Student Assistant (stochastic optimization), IBM Institute for Supercomputing and Applied Mathematics, Heidelberg, Germany |

## Teaching experience

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| 2018, Fall | Adjunct Instructor: GEOS F436/636 “Beyond the mouse: Computer programming and automation for geoscientists” |
| 2013 - 2018 | Guest lectures on fire remote sensing and ground-based visible and infrared spectroscopy, GEOS F422 (“Geoscience applications of remote sensing”), GEOS F458 (“Geoscience applications of GPS and GIS”), and GEOS F654 (“Visible and infrared remote sensing”), UAF |
| 2016 - 2017 | Laboratory TA for GEOS F120 (“Earthquakes, glaciers, volcanoes”), UAF |
| 2014 - 2017 | Mentored student projects in UAF GEOS F422 (remote sensing) and independent study, UAF |
| 2015, October | Co-taught R workshop (“Resource Selection Function”), UAF |
| 2014, October | Co-taught GIS workshop to Alaska Dept. of Fish and Game, Juneau, Alaska |
| 2014, March | University of the Arctic: course development “Arctic Natural Hazards”. Kick-off workshop Arkhangelsk, Russia |
| 2013, August | Mentored two undergraduate research interns (USDA-GIS workshop), and co-taught workshop materials, UAF |
| 2002 - 2004 | Secondary school teacher, Île-de-France school system, France |
| 1992 - 1994 | Teaching Assistant (calculus, linear algebra, physics), U Heidelberg, Germany |

## Professional experience

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| 2010 - 2011 | Client Solutions Engineer, Bazaarvoice Inc., London, UK |
| 2006 - 2010 | Technology Operations Manager/Tech Support Lead, Epsilon, London, UK |
| 2004 - 2006 | Web developer and online producer, freelance, Paris, France |

## Awards and honors

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| 2018 | UAF Geophysical Institute Best Student Paper Award for Waigl et al., 2017 |
| 2012 - 2016 | NASA Earth and Space Science Fellowship (PhD Project) |
| 2014 | UAF Center for Global Change/CIFAR Student Award Competition |
| 2015 | Earth Science Information Partners (ESIP) Federation Robert G. Raskin Scholarship |
| 1988 - 1994 | German National Merit Foundation (Studienstiftung des deutschen Volkes) |
| 1988 - 1994 | Scholarship for highly talented students of the state of Bavaria, Germany |

## Publications

### PhD thesis

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

### Peer-reviewed articles and book chapters

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.

Starkenburg, D. P., Waigl, C. F., 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. in press, expected May 2018. IGI Global, p. 270. DOI: 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.

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.

### Extended abstracts

Stuefer, M., Waigl, C. F., 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.

### Articles in preparation

Waigl, C. F., A. Prakash, and M. Stuefer (2018). *Sub-pixel fire characterization and sensitivity analysis with VIIRS I- and M-band data*. manuscript in preparation.

## Presentations and conferences

### Conference talks

Waigl, C. F. (2017). 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 presented 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. M. 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 presented at the 2016 AGU Fall Meeting, San Francisco, CA.

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

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

### Selected poster presentations

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

Prakash, A., R. Gens, J. Cristobal, Waigl, C. F., M. S. Balazs, P. R. Graham, C. E. Butcher, and E. B. Sparrow (2015). 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 presented 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 presented at the 2014 AUG Fall Meeting, San Francisco, CA.

Gens, R., A. Prakash, G. Ozbay, S. Sriharan, M. S. Balazs, A. Chittambakkam, D. P. Starkenburg, Waigl, C., 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*. Vol. 1. B51H-0399. Poster presented at the 2013 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 presented at the ARM Science Team Meeting, Crystal City, VA, March 15, 2012.

Waigl, C., 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 presented at the 2012 AUG Fall Meeting, San Francisco, CA.

### Outreach and volunteer contributions

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| 2019, Feb 23 | PyCascades, Seattle, WA: "Abstraction for students of all the things" |
| 2017, April 3-4 | 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 |
| 2015 - 2017 | UAF GI portable planetarium: multiple presentations to K-8 students |
| 2017, May 18 | PyCon US, Portland, OR: "The Next Step: Finding Model Parameters With Random Walks" |
| 2016, April 26 | OpenVis Conference, Boston, MA: "Our Planet Seen from Space" |
| 2015, April 10 | PyCon US, Montréal, Canada: "Satellite Mapping for Everyone" |
| 2014, Sep 27 | Arctic AAAS, Fairbanks, AK: "The Arctic seen from space: enhancing STEM education with interactive learning" |

## Skills & interests

**Satellite-based and airborne remote sensing**

- Processing of multispectral, hyperspectral, broadband TIR, optical and SAR imagery using proprietary (ENVI, ArcMap, ERDAS Imagine, Agisoft, ENSO Mosaic) and open-source (Python, R, QGis, MapReady, Sentinel Toolboxes) software
- Land cover classification and feature / anomaly detection with machine learning and spectral mixture modeling
- Terrain and atmospheric correction (ATCOR, MODTRAN) of multi- and hyperspectral data
- Planning and instrument operation for aerial surveys as well as field-based validation in the boreal and Arctic environment using soil & vegetation sampling, and instrumentation such as Spectral Evolution PSR+ and ADS FieldSpec spectroradiometers, NEO HySpex hyperspectral camera, and the FLIR suite of TIR cameras

**Wildfire in the high northern latitudes**

- Fire detection and temperature retrieval using satellite-borne and airborne remote sensing (multispectral, hyperspectral, multi-sensor approaches)
- Mapping of low-intensity or recurring fires, and fire hazard from coal seams and oil shales
- Pre-fire vegetation mapping and post-fire impact with particular interest in carbon-rich Arctic tundra and boreal peatland soils
- Modeling of fire spread and smoke dispersion using the Weather Research and Forecasting System (WRF/WRF-Chem/WRF-Fire)

**Software engineering for scientific applications**

- Programming in Python, R, MATLAB (plus JavaScript, C, IDL, NCL, Fortran 90)
- Cloud-based environments (AWS, Google Earth Engine)
- Usability of scientific data, maintainability, metadata standards
- Software engineering practices for reproducible science (shared repositories, open data)

**Languages**

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