Nathan Mietkiewicz, Ph. D.

Postdoctoral Reserach Fellow, Earth Lab
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Education

Clark University, Worcester, MA

Ph. D., Geography, 2012 - 2016
Dissertation Title: Interactions of spruce beetle outbreak and wildland fire in Colorado: legacies and future projections under a changing climate.
Advisor: Dr. Dominik Kulakowski
M.A., Geography, 2015
M.S., GIS for Development and Environment, 2010-2013
Thesis: A century of ecological change in a subalpine forest of the Swiss Alps.
Advisors: Dr. Dominik Kulakowski, Dr. John Rogan, Dr. Peter Bebi **University of Maine, Orono, ME**
B.S., Earth Science, 2009

Technology Proficiencies

Applications: RStudio, Jupyter Notebooks, Amazon Web Services (S3, EC2), ArcGIS Platform, QGis, IDRISI/Terrset, Adobe CS6 Illustrator

Programming: R (expert), Python (general understanding), RMarkdown, Docker, GitHub, UNIX Shell Programing (general understanding)

Software and Dataset Development

ICS-209-PLUS - An all-hazards dataset mined from the US National Incident Management System 1999-2014. doi: 10.6084/m9.figshare.8048252.v8. url: https://figshare.com/articles/ICS209-PLUS_Cleaned_databases/8048252

Fire Events Delineation (FIRED) - Events-delineation algorithm used to derive fire events from the MODIS burned area product (MCD64A1) for the U.S. from 2001-19. In review.

FIREDr - R package to automatically download and process MODIS burned area product (MCD64A1). Unpublished. url: https://github.com/NateMietk/FIREDr

Peer-reviewed Publications

Rogan, J., Elmes, A., Rosenblum, H., **Mietkiewicz, N.**, Kulakowski, D., Stow, D. (under evaluation). *Drivers of fire ignition in Southern California Mediterranean-type Ecosystems*. Fire Ecology.

St. Denis, L, **Mietkiewicz, N**, Short, K C, Buckland, M, Balch, J K, (under evaluation) *ICS-209-PLUS - An all-hazards dataset mined from the US National Incident Management System 1999-2014*. Scientific Data.

N. Mietkiewicz, J. K. Balch, T. Schoennagel, S. Leyk, L. St. Denis, B. Bradley. (under evaluation) *In the line of fire: Consequences of human-ignited wildfires to homes in the U.S. (1992-2015)*. Science Advances.

Joseph, M. B., M. W. Rossi, **N. P. Mietkiewicz**, A. L. Mahood, M. E. Cattau, L. A. St. Denis, R. C. Nagy, V. Iglesias, J. T. Abatzoglou, and J. K. Balch. (2019) *Understanding and predicting extreme wildfires in the contiguous United States*. Ecological Applications. doi:10.1002/eap.1898.

Balch, J., T. Schoennagel, A. Williams, J. Abatzoglou, M. Cattau, **N. Mietkiewicz**, and L. St. Denis. 2018. *Switching on the Big Burn of 2017*. Fire 1.

Mietkiewicz, N., D. Kulakowski, and T. T. Veblen 2018. *Pre-outbreak forest conditions mediate the effects of spruce beetle outbreaks on fuels in subalpine forests of Colorado*. Ecological Applications 28:457-472.

Mietkiewicz, N., D. Kulakowski, D. Rogan, and P. Bebi. 2017. *Long-term change in sub-alpine forest cover, tree line and species composition in the Swiss Alps*. Journal of Vegetation Science. 28:951-964. DOI: 10.1111/jvs.12561

Schoennagel, T., J. K. Balch, H. Brenkert-Smith, P. E. Dennison, B. J. Harvey, M. A. Krawchuk, **N. Mietkiewicz**, P. Morgan, M. A. Moritz, R. Rasker, M. G. Turner, and C. Whitlock. 2017. *Adapt to more wildfire in western North American forests as climate changes*. Proceedings of the National Academy of Sciences. 114:4582-4590.

Mietkiewicz, N. and D. Kulakowski. 2016. *Relative importance of climate and mountain pine beetle outbreaks on the occurrence of large wildfires in the western US*. Ecological Applications:10.1002/eap.1400

Bakaj, F., **N. Mietkiewicz**, T. T. Veblen, and D. Kulakowski. 2016. *The relative importance of tree and stand properties in susceptibility to spruce beetle outbreak in the mid-20th century*. Ecosphere 7(10):e01485. 10.1002/ecs2.1485

Hart, S. J., T. T. Veblen, **N. Mietkiewicz**, and D. Kulakowski. 2015. *Negative Feedbacks on Bark Beetle Outbreaks: Widespread and Severe Spruce Beetle Infestation Restricts Subsequent Infestation*. PLoS ONE 10:e0127975.

Pre-prints

Joseph, M. B., M. W. Rossi, **N. P. Mietkiewicz**, A. L. Mahood, M. E. Cattau, L. A. St. Denis, R. C. Nagy, V. Iglesias, J. T. Abatzoglou, and J. K. Balch. 2018. Understanding and predicting extreme wildfires in the contiguous United States. bioRxiv; doi: https://doi.org/10.1101/384115

Book Chapters

Rogan, J., and **N. Mietkiewicz**. 2015. *Land Cover Change Detection* in A. Aranganathan, editor. Land Resources Monitoring, Modeling, and Mapping with Remote Sensing.

Current research appointment

Postdoctoral Research Associate 2016–present

Earth Lab and the Cooperative Institute for Research in Environmental Sciences, University of Colorado at Boulder

-Deployed geospatial, reproducible workflows in a salable, cloud-compute environment via Amazon Web Services (AWS) leveraging Docker and GitHub to build stable, collaborative work environments across platforms.
-Wrote clean, efficient, reproducible R code to analyze big geospatial data.
-Built out and optimizing statistical models using a variety of techniques, with focus on machine learning algorithms.
-Mentored/managed undergraduate and graduate level interns and research assistants.
-Authored and co-authored 6 peer-review publications with 3 more in review and 10 in progress.
-Authored and Co-authored over $15 million in research grant proposals.

Research Assistant 2013-2016

Graduate School of Geography, Clark University, Worcester, MA

-Developed and led a successful field campaign located in the backcountry of the Colorado Rockies.
-Managed a team of 8 undergraduate and graduate students in remote, mountainous areas for 18 weeks over the course of 2 summers.
-Collected over 2,000 tree cores, 1,000 seedling/sampling samples, and data ranging over 3 projects, resulting in 4 peer-reviewed publications and my dissertation.

-Synthesized field data that was fed into large wildfire behavior prediction models under current and 3 future climate scenarios across the Southern Rocky Mountains.
-Managed the Forest Ecology Lab, where duties included maintaining, ordering, inventorying, and supporting both computer and field equipment for the research and classroom laboratories.

Past research Appointments

2012	Research and Development, Clark Labs, Worcester, MA
2011	GIS Consultant, Department of Public Works, Ashland, MA GIS Analyst, United States Department of Agriculture: National Resource Conservation Service
2008	Field Researcher, Scott Glacier, Antarctica via University of Maine, Orono
2007	Field Researcher, Marine Sediments Laboratory, University of Maine, Orono
2006	Laboratory Technician, Climate Change Institute, University of Maine, Orono Numerical Modeling Technician, Numerical Modeling Laboratory, University of Maine, Orono

Teaching Appointments

Faculty Positions

Clark University

2015 Forest Ecology (GEOG 116); Overall Effectiveness = 4.6/5

Teaching Assistant Positions

Clark University

2015 Advanced Topics in GIS: Raster GIS (GEOG 397); Overall Effectiveness = 4.94/5

2014 Introduction to Remote Sensing (GEOG 383); Overall Effectiveness = 4.89/5
Advanced Topics in GIS: Raster GIS (GEOG 397); Overall Effectiveness = 4.74/5

2013 Forest Ecology (GEOG 116); Overall Effectiveness = 4.62/5
Advanced Topics in GIS: Raster GIS (GEOG 397); Overall Effectiveness = 4.74/5

2012 Earth System Science (GEOG 104); Overall Effectiveness = 4.97/5

Grants, Awards, and Fellowships

2019	$898,997 - NSF RIDIR Proposal: The next generation of historical settlement data products for the conterminous U.S. over 150 Years. Senior Personal. Pending.
2018	$1,287,690 - Macroscale Resilience: Assessing the recovery of western U.S. forests to compound disturbance and enabling continental-scale exploration of resilience through open NEON science. Senior Personal. Pending. $931,768 - CAREER: Fire impacts on forest carbon recovery in a warming world: training the next generation of Earth analysts by exploring a missing scale of observations. Postdoctoral Associate Support.
2017	$1200 - Fire Predicition Across Scales conference travel award - Columbia University
2015	$700 - Clark University's Outstanding Teaching Assistant Award $300 - Marion I. Wright '46 Travel Award, Fall 2015 $250 - Pruser Dissertation Enhancement Award $300 - Graduate Student Council Travel Award, Spring 2016
2013	$600 - Marion I. Wright '46 Travel Award, Spring/Fall 2013 $750 - Pruser Dissertation Enhancement Award
2012	$4,000 - Libbey Enhancement Award $55,000 - Full tuition remission and stipend (5 years, approx. per year)
2010	$15,980 - Awarded scholarship towards Master's degree (2 years, approx. per year)

Professional Presentations

2019 **Mietkiewicz, N.**. *Characterizing wildfire risk to the wildland-urban interface in the U.S.* IGNITE talk at the USDA Forest Service Stakeholder Workshop: Urban and Wildland-Urban Interface Forests Under Changing Conditions, Denver, CO, USA. Invitation.

2019 **Mietkiewicz, N. P.**, Balch, J. K., Schoennagel T., Leyk S., St. Denis L., Bradley B. A., *In the line of fire: Consequences of human-ignited wildfires to homes in the U.S. (1992-2015)*. Paper presentation at the International Association of Wildland Fire 6th Fire Behavior and Fuels Conference, Marseille, France. Invitation.

2019 **Mietkiewicz, N. P.**, Balch, J. K., Schoennagel T., Leyk S., St. Denis L., Bradley B. A. *In the line of fire: Consequences of human-ignited wildfires to homes in the U.S. (1992-2015)*. Poster presentation at the CIRES Rendezvous, Boulder, CO.

2019 **Mietkiewicz N.** *Modeling wildfire in the 21st century: big data and machine learning in the cloud*. Flashtalk at the North Central Climate Adaptation Science Center Open House, Boulder, CO. Invitation.

2019 **Mietkiewicz, N. P.**, Balch, J. K., Schoennagel T., Leyk S., St. Denis L., Bradley B. A. *In the line of fire: Consequences of human-ignited wildfires to homes in the U.S. (1992-2015)*. Poster presentation at the USGS North Central Climate Adaptation Science Center Open House, Boulder, CO. Invitation.

2017 **Mietkiewicz, N.**, Balch, J., St. Denis, L., Schoennagel, T. *Drivers of historic and future wildfire occurrence across the United States: the relative contribution of human ignitions vs climate to fire size and probability*. Presentation at the Fire Prediction Across Scales Conference, Columbia University, New York City, NY, USA.

2017 **Mietkiewicz, N.**, Balch, J., St. Denis, L., *Human-ignited fires at the wildland-urban interface: consequences and costs*. Presentation at the Ecological Society of America Portland, OR, USA.

2016 **Mietkiewicz, N.**, D. Kulakowski, and T.T. Veblen. *Spruce beetle legacies on fire behavior under a varying climate in CO, USA*. Paper presentation at the Association of American Geographers, San Francisco, CA.

2016 **Mietkiewicz, N.**, D. Kulakowski, and T.T. Veblen. *Spruce beetle legacies on fire behavior under a varying climate in CO, USA*. Poster presentation at the 5th International Fire Behavior and Fuels Conference, Portland, OR

2014 **Mietkiewicz, N.**, Kulakowski, D. *How do spruce beetle outbreaks affect fuel loads in the southern Rocky Mountains, CO*. Paper presented at the Association of American Geographers, Tampa, FL.

2013 **Mietkiewicz, N.**, Kulakowski, D., and Rogan, J. *Identifying sub-continental drivers of wildland fire under a varying climate*. Paper presented at New England-St. Lawrence Valley Geographical Society (NESTVAL), Worcester, MA.

2013 **Mietkiewicz, N.**, Kulakowski, D., and Rogan, J. *What are the landscape requirements preceding wildland fire occurrence?* Paper presented and Biogeography session chaired at the Annual Conference of the Association of American Geographers, Los Angeles, CA.

2012 **Mietkiewicz, N.**, Kulakowski, D., and Rogan, J. *A century of ecological change in a subalpine forest of the Swiss Alps*. Paper presented at the Annual Conference of the Association of American Geographers, New York, NY.

Outreach, Synergistic Activities, and Professional Development

Peer-reviewed for the following journals: Ecology and Evolution, International Journal of Wildfire, Open Access Forests, Ecography.

2019 **Invited Participant** at the USDA Forest Service Stakeholder Workshop: Urban and Wildland-Urban Interface Forests Under Changing Conditions, Denver, CO.

2019 **Inviited Participant** at the USGS North Central Climate Adaptation Science Center Open House, Boulder, CO.

2019 **Invited Participant** at a Global WUI Working Group at the International Association of Wildland Fire 6th Fire Behavior and Fuels Conference, Marseille, France.

2018 **Invite Participant** in the Environmental Extremes CodeFest, Univeristy of Colorado, Boulder, CO.

2017 **Invited Speaker** in an undergraduate class, Introduction to Physical Geography, University of Colorado, Boulder, CO.

2017 **Participant** at the Rocky Mountain Advanced Computing Consortium 2017, University of Colorado, Boulder, CO.

2017 **Invited Speaker** at the Wildfire Information Development Workshop, Boulder, CO, USA. Entitled: Human-ignited fires at the wildland-urban interface: case study for using ICS-209s.

2017 **Participant** at the NASA Wildland Fire Applications 2017 Team Meeting, University of Colorado, Boulder, CO.

2017 **Invited Speaker** at the Earth Science & Observation Center Colloquium, University of Colorado, Boulder, CO. Entitled: Earth Lab: Accelerating discovery with advanced earth analytics.

2014 **Participant** in a Seminar in College Teaching, Certificate in College Teaching. Colleges of Worcester Consortium, Inc.

2014 **Professional exhibitor** representing Clark Labs at the Annual Conference of the Association of American Geographers, Tampa, FL.

2014 **Professional exhibitor** representing Clark Labs at the American Society for Photogrammetry and Remote Sensing, Baltimore, MD.

2013 **Professional exhibitor** representing Clark Labs at the Annual Conference of the Association of American Geographers, Los Angeles, CA.

Media Contributions

2019 J. Balch, M. Cattau, J. McGlinchy, **N. Mietkiewicz**, and V. Scholl worked with *PBS Nova* crew filming in Cold Springs wildfire field site for *Wildfires*.