

TUAN DUNG NGUYEN

237 Michael Smith Natural Resources Building

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EDUCATION

- **PhD in Forest Science** (2015). Colorado State University.
- **MS in Forest Science** (2012). Colorado State University.

RESEARCH AND OUTREACH FOCUS

I specialize in forest and wildland fire management and planning, with a focus on integrating long-term economic, ecological, and social considerations into decision-making processes across local to regional scales. My work leverages scientific data, advanced methodologies, and analytical techniques to address emerging challenges in forest and wildfire management. In addition to producing impactful publications, I develop data products, software, web applications, and decision-support tools to benefit diverse audiences, including researchers, managers, policymakers, and the public. My recent research emphasizes spatially explicit analyses and model-driven solutions for complex wildfire management challenges. Key areas include landscape-scale fuel treatment and fuel break allocation, fire-line and suppression effectiveness, wildfire behavior and risk assessment, and firefighting resources scheduling.

RESEARCH POSITIONS

- **Research Scientist II** (2024-present) & **Postdoctoral Fellow** (2022-2023).
Department of Forest & Rangeland Stewardship, Colorado State University.
Key responsibilities: Led research on fuel treatment and fuel break modeling, wildland fire prioritization and its driving factors, firefighting resources scheduling, and fire-line and fire suppression effectiveness analyses.
- **Postdoctoral Fellow** (2016-2021).
Department of Forest & Rangeland Stewardship, Colorado State University.
Key responsibilities: Developed PRISM, a decision support system for national forest planning. PRISM facilitates the rapid and efficient generation of ecological and timber information in alignment with the 2012 Planning Rule implementing the National Forest Management Act of 1976.
- **Graduate Research Assistant** (2013-2015).
Department of Forest & Rangeland Stewardship, Colorado State University.
PhD dissertation: A multistage stochastic program with recourse for scheduling prescribed burning based fuel treatments with consideration of future wildland fires and fire suppressions.
- **Research Affiliate** (2009-2012).
USDA Forest Service, Rocky Mountain Research Station, Fort Collins, Colorado.
Master thesis: A spatial stochastic programming model for timber and core area management under risk of stand-replacing fire.

TEACHING POSITIONS

- **Guest Lecturer** (2022-2024). Department of Forest & Rangeland Stewardship, Colorado State University. *Lectured on*: Quantitative Analysis in Forest Resource Management, Advanced Quantitative Methods in Forestry.
- **Lecturer** (2020-2021). Faculty of Business and Economics, Phenikaa University, Vietnam. *Lectured on*: Introduction to Data Science and Artificial Intelligence, Research methodology, Research methodology in economics (MBA Program).
- **Co-Instructor** (2017). Department of Forest & Rangeland Stewardship, Colorado State University. *Lectured on*: Advanced Quantitative Methods in Forestry.
- **Lecturer** (2016). Silviculture Department, Vietnam National University of Forestry. *Lectured on*: Quantitative Methods in Forest Resource Management.
- **Graduate Teaching Assistant** (2013). Department of Forest & Rangeland Stewardship, Colorado State University. *Lectured on*: GIS Applications in Natural Resource Management.
- **Graduate Teaching Assistant** (2011). Department of Forest & Rangeland Stewardship, Colorado State University. *Lectured on*: Applied Geographic Information System.
- **Graduate Teaching Assistant** (2008). Department of Forest & Rangeland Stewardship, Colorado State University. *Lectured on*: Quantitative Methods in Forest Resource Management.

PUBLICATIONS

REFEREED PAPERS

- **Nguyen, D.**, E. Belval, Y. Wei, and D. Calkin. A historical analysis of factors driving the daily prioritization of wildland fires in California. *International Journal of Disaster Risk Reduction* (2025). <https://doi.org/10.1016/j.ijdrr.2025.105967>
- **Nguyen, D.**, Y. Wei, E. Belval, J. Young, C. O'Connor, C. Dunn, and D. Calkin. Optimizing fuel break management for core habitat protection against wildfires in the northern Great Basin. *Ecological Informatics* (2025). <https://doi.org/10.1016/j.ecoinf.2025.103357>
- **Nguyen, D.**, Y. Wei, E. Belval, M. Thompson, B. Gannon, J. Young, C. O'Connor, and D. Calkin. An optimization model to prioritize fuel treatments within a landscape fuel break network. *PLoS ONE* 19(12): e0313591 (2024). <https://doi.org/10.1371/journal.pone.0313591>
- Thompson MP, **Nguyen D**, Moran CJ, Scott J, Wei Y, Young B. Simulating Daily Large Fire Spread Events in the Northern Front Range, Colorado, USA. *Fire* 7(11):395 (2024). <https://doi.org/10.3390/fire7110395>
- **Nguyen, D.**, E. Belval, Y. Wei, K. Short, and D. Calkin. Dataset of United States Incident Management Situation Reports from 2007 to 2021. *Scientific Data* 11, 23 (2024). <https://doi.org/10.1038/s41597-023-02876-8>
- **Nguyen, D.**, E. Henderson, and Y. Wei. PRISM: a decision support system for forest planning. *Environmental Modelling and Software*, 155 (2022). <https://doi.org/10.1016/j.envsoft.2022.105515>
- **Nguyen, D.** and Wei, Y. A Multistage Stochastic Program to Optimize Prescribed Burning Locations Using Random Fire Samples. *Forests*, 13(6), p.930 (2022). <https://doi.org/10.3390/f13060930>

- Wei, Y., M. Bevers, **D. Nguyen**, and E. Belval. A Spatial Stochastic Programming Model for Timber and Core Area Management Under Risk of Fires. Forest Science 60, no. 1 (2014): 85-96. <https://doi.org/10.5849/forsci.12-124>

WORKING PAPERS

- **Nguyen, D.**, Y. Wei, E. Belval, and D. Calkin. Optimal management of firefighting crews across regions of the United States (in preparation)
- **Nguyen, D.**, Y. Wei, E. Belval. An integrated approach for managing linear fuel breaks and prescribed burnings to minimize wildfire impact in Arapaho and Roosevelt National Forests (in preparation)

DESKTOP APPLICATIONS

- **Nguyen, D.** IMSR-Tool: A desktop application to mine United States Incident Management Situation Reports (1.05). zenodo. <https://doi.org/10.5281/zenodo.8406263>
- **Nguyen, D.**, E. Henderson, Y. Wei, and D. Anderson. PRISM: a decision support system for forest planning. <https://bitbucket.org/Prism-Members/prism/src/master>

WEB APPLICATIONS

- **Nguyen, D.** A Google Earth application to visualize optimal fuel-break locations in the Southern California under different wildfire management scenarios. <https://thumit.users.earthengine.app/view/landscape-fuelbreak-prioritization>
- **Nguyen, D.** A webapp dashboard for optimal management of firefighting crews across regions of the United States (1-min cold start). <https://crew-assignment-dashboard.onrender.com>

DATA PRODUCTS

- **Nguyen, D.**, E. Belval, Y. Wei, K. Short, and D. Calkin. Updated Dataset of United States Incident Management Situation Reports, 2007-2024. figshare. Dataset. <https://doi.org/10.6084/m9.figshare.28607696.v1>
- **Nguyen, D.**, E. Belval, Y. Wei, K. Short, and D. Calkin. Dataset of United States Incident Management Situation Reports, 2007-2021. figshare. Dataset. <https://doi.org/10.6084/m9.figshare.24243184.v3>
- **Nguyen, D.**, Y. Wei, E. Belval, M. Thompson, B. Gannon, J. Young, C. O'Connor, and D. Calkin (2024). Southern California dataset for wildfire management using fuel breaks. figshare. Dataset. <https://doi.org/10.6084/m9.figshare.27187632.v1>

SOURCE CODE

- **Nguyen, D.** (2024). Southern California optimization model source code. Zenodo. <https://doi.org/10.5281/zenodo.13903341>
- **Nguyen, D.** (2024). Northern Great Basin optimization model source code. Zenodo. <https://doi.org/10.5281/zenodo.14271050>
- Others at GitHub <https://github.com/thumit> and BitBucket <https://bitbucket.org/Prism-Members/prism/src/master>

PRESENTATIONS

- **Nguyen, D.**, E. Belval, Y. Wei, D. Calkin. Optimizing Wildland Fire Crew Contracting and Deployment Across the United States. SAF2025 National Convention. 22-25 October 2025. Hartford, Connecticut, USA.
- **Nguyen, D.**, E. Belval, Y. Wei, D. Calkin. Understanding California's Wildfire Prioritization Process for Adaptive Management. SAF2025 National Convention. 22-25 October 2025. Hartford, Connecticut, USA.
- Wei, Y., **D. Nguyen**, E. Belval, D. Calkin. Optimizing landscape-scale fuel break management for wildfire containment in California and the Great Basin. 11th International Fire Ecology and Management Congress. 2-6 December 2025. New Orleans, Louisiana, USA.
- **Nguyen, D.**, Y. Wei, E. Belval, D. Calkin. Using GIS and Optimization Models for Strategic Management of Linear Fuel Breaks to Mitigate Wildfire Risk. 72nd Annual North American Meetings of the Regional Science Association International. 12-15 November 2025. Denver, Colorado, USA.
- Wei, Y., **D. Nguyen**, M. Thompson, E. Belval, D. Calkin, K. O'Connor. Optimize fuel break network to support prescribed fires and mitigate future wildland fire risk. 20th Symposium on Systems Analysis in Forest Resources. 13-17 May 2024. Hondarribia, Basque Country, Spain.
- Scott, J., C. Moran, T. Hoecker, B. Young, **D. Nguyen**, Y. Wei, K. O'Connor. Advances in wildfire simulation for dynamic, actionable risk analysis. 4th Southwest Fire Ecology Conference. 18-22 November 2024. Santa Fe, New Mexico, USA.
- **Nguyen, D.**, M. Thompson, and Y. Wei. Analyzing daily wildfire spread events to inform strategic wildfire management using potential operational delineations. SAF2024 National Convention. 17-20 September 2024. Loveland, Colorado, USA.
- **Nguyen, D.**, Y. Wei, E. Belval, M. Thompson, B. Gannon, J. Young, K. O'Connor, D. Calkin. An optimization framework for landscape fuel break prioritization. USFS Rocky Mountain Research Station - Spring Seminar. 10 January 2024. Fort Collins, Colorado, USA.
- **Nguyen, D.**, Y. Wei, E. Belval, M. Thompson, B. Gannon, J. Young, and D. Calkin. An optimization framework for landscape fuel-break prioritization in Southern California. 10th International Fire Ecology and Management Congress. 4-8 December 2023. Monterey, California, USA.
- **Nguyen, D.**, Y. Wei, and E. Henderson. PRISM: A Decision Support System for Adaptive Forest Management and Planning. SAF2023 National Convention. 25-28 October 2023. Sacramento, California, USA.
- Wei, Y., **D. Nguyen**, E. Belval, M. Thompson, B. Gannon, J. Young, D. Calkin. A scalable optimization model to prioritize landscape fuel-break investment for effective wildfire management. 2023 INFORMS Annual Meeting. 15-18 October 2023. Phoenix, Arizona.
- **Nguyen, D.**, Y. Wei, and E. Henderson. PRISM: An Analytical Tool for Forest Plan Development. ICFSM 2023: International Conference on Forest Science and Management. 24-25 April 2023. New York, USA.
- **Nguyen, D.**, E. Henderson, and Y. Wei. PRISM: A new management scheduling model for United States National Forest planning. 19th Symposium on Systems Analysis in Forest Resources. 24-27 July 2022. Estes Park, Colorado, USA.
- Wei, Y., **D. Nguyen**, B. Gannon, E. Belval, M. Thompson, J. Young, D. Calkin, and C. O'Connor. Developing a fuel break prioritization model using stochastic fire simulation results. 19th

Symposium on Systems Analysis in Forest Resources. 24-27 July 2022. Estes Park, Colorado, USA.

- Wei, Y., E. Henderson, and **D. Nguyen**. A Joint Effort to Develop PRISM for Strategic Forest Planning. USFS Annual Analyst meeting. Oct 22-24, 2019. Fort Collins, Colorado, USA.
- Anderson, D., **D. Nguyen**, E. Henderson, and Y. Wei. PRISM - Harvest Scheduling using the 2012 Planning Rule. 2018 INFORMS Annual Meeting. November 04-07, 2018. Phoenix, Arizona, USA.
- **Nguyen, D.** and Y. Wei. A multistage stochastic program with recourse for scheduling prescribed burning to mitigate watershed fire risk. 2017 University Council on Water Resources and National Institutes for Water Resources Annual Conference - Water in a changing environment. June 13-15, 2017. Fort Collins, Colorado, USA.
- **Nguyen, D.** and Y. Wei. Develop a multistage stochastic program with recourse for scheduling prescribed burning based fuel treatments with consideration of future wildland fires and fire suppressions. 6th International Fire Ecology and Management Congress. Nov 16-20, 2015. San Antonio, Texas, USA.
- Wei, Y., M. Bevers, and **D. Nguyen**. Using Stochastic Programming in Harvest Scheduling and Core Area Management. 14th Symposium for Systems Analysis in Forest Resources. March 8-11, 2011. Maitencillo, Chile.
- Wei, Y., M. Bevers, and **D. Nguyen**. A stochastic programming approach for forest management with natural disturbances. 2010 INFORMS Annual Meeting. Nov 7-10, 2010. Austin, Texas, USA.
- **Nguyen, D.**, M. Bevers, and Y. Wei. A stochastic programming approach to forest management with natural disturbances. Society of Applied Mathematics 2010 Conferences on the Life Science. Pittsburg, Pennsylvania, USA.
- **Nguyen, D.**, M. Bevers, and Y. Wei. Developing a stochastic programming model for timber and core area management. 13th symposium on system analysis in forest resources. May 26-29, 2009. Charleston, South Carolina, USA.

HONORS & AWARDS

- Outstanding academic recognition, issued by Golden International Honor Society (2011).
- Vietnamese Government **Full Scholarship for PhD** Study at Colorado State University (2009).
- Vietnamese Government **Full Scholarship for MS** Study at Colorado State University (2007).
- Graduation with distinction (**University's Top 1**) with the excelent academic recognition for the 2003-2007 training period, issued by Vietnam National University of Forestry (2007).
- **First Prize** in the Third National Conference on Science and Technology for University and College Students of Agriculture-Forestry-Pisciculture, issued by Ministry of Education and Training of Vietnam (2007).
- **First Prize** in the National Competition for Student Researchers across all disciplines, issued by Ministry of Education and Training of Vietnam (2005).
- **First Prize** in the Vietnam for Technology National Competition - VIFOTEC, issued by Ministry of Education and Training of Vietnam (2005).
- **Youth Creative Medal**, issued by Ministry of Education and Training of Vietnam (2005).

CONTRACTS & GRANTS

- Assessing fuel break effectiveness using an empirical spatial fire planning model in the context of suppression operations (2020-2024). Interdisciplinary. Joint Fire Science. **Participant** with Erin Belval (PI), Yu Wei (Co-PI), Benjamin Gannon, Christopher O'Connor, Christopher Dunn, Dave Calkin, Matthew Thompson, Jessica Haas. **\$500K**.
- Develop a decision tool to support USFS National Forest planning. Disciplinary (2016-2021). USFS Region I. **Participant** with Yu Wei (PI), Eric Henderson, David Anderson. **\$280K**.

SERVICES

- **Deputy Head** at Department of Science, Technology and International Cooperation, Vietnam Central Association of Forest Science and Technology.
- **Primary Reviewer** of applications to the **NASA Postdoctoral Program**, which offers research opportunities to highly-talented US and non-US scientists to engage in ongoing NASA research projects: <https://npp.orau.org>
- **Reviewer** of proposals (organized sessions, panel discussions, lecture presentations, science flashes) and **Session Moderator** for the **Society of American Foresters (SAF) National Convention**, a premier annual event that brings together leading foresters, researchers, and policymakers to reflect on forestry's legacy, share cutting-edge advancements, and shape the future of sustainable forest management.
- **Reviewer** for Journal (ISSN): Geophysical Research Letters (0094-8276). Operations Research Perspectives (2214-7160). Risk Analysis (0272-4332). Stochastic Environmental Research and Risk Assessment (1436-3240, 1436-3259). Ecological Informatics (1574-9541). Fire Ecology (1933-9747). International Journal of Wildland Fire (1448-5516). Fire (2571-6255). Canadian Journal of Forest Research (0045-5067). Forests (1999-4907). Frontiers in Forests and Global Change (2624-893X). Sustainability (2071-1050). Atmosphere (2073-4433). Applied Sciences (2076-3417). Plos One (1932-6203). MethodsX (2215-0161).
- **Co-Advisor & Graduate Committee Membership**: Jered May (Master of Science at Department of Forest and Rangeland Stewardship, Colorado State University, 2025-2026).
- **Membership** of **American Geophysical Union (AGU)**, the world's largest Earth and space sciences community.