

# Ryan A. Jacobson

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## Summary

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Ryan A. Jacobson is a graduate from the University of British Columbia with a PhD in Chemical and Biological Engineering, The University of Idaho with a Master's degree in Natural Resources and a Bachelor's degree in Geology and Geophysics. Focusing on renewable energy and natural resource processing, Jacobson has led research investigating the regional economic impacts of bio-fuels projects, biomass mobilization technology time studies, and techno-economic analysis of biomass harvesting systems. Jacobson's work appears in magazines, peer-reviewed journals, and conference papers in the fields of forestry, bio-engineering and renewable energy.

## Fields of Interest

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### Primary

Systems Analysis, Systems Modeling, Optimization, Energy Economics, Natural Resource Economics

### Secondary

Engineering Economics, Logistics, Data Analysis

## Education and Training

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### University of British Columbia

**Ph.D.- Chemical and Biological Engineering** (2016-2022)

**Dissertation:** Pelletization Strategies to Reduce Costs of Wildfire Mitigation

### University of Idaho

**Master's- Natural Resources** (2013-2015)

**Bioregional Planning Certification** (2013-2015)

**Thesis:** Multi-spatial Analysis of Forest Residues for Bioenergy

### University of Wyoming

**B.S.- Kinesiology- Athletic Training** (2006-2009)

**B.S.- Geology and Geophysics** (2009-2012)

## Publications

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(\*invited, \*\*submitted, competitive)

1. \*\*Jacobson, R. A. et al. Multi-spatial analysis of forest residue utilization for bioenergy. *Biofuels Bioprod. Biorefining* 10, 560–575 (2016).
2. \*Ebadian, M., Jacobson, R. Yazdanpanah, F., Sokhansanj, S., Biomass Co-firing in Alberta. *Canadian Biomass Magazine*. (November 22, 2016).
3. \*\*Roybal, L. G., Jeffers, R. F., McGillivray, K. E., Paul, T. D. & Jacobson, R. Modeling and simulating blast effects on electric substations. in 2009 IEEE Conference on Technologies for Homeland Security 351–357 (IEEE, 2009). doi:10.1109/THS.2009.5168058.
4. \*\*Newman, S. et al. 'The Devil Is in the Details:' Inland Northwest Stakeholders' Views on Three Forest-Based Bioenergy Scenarios. *For. Sci.* 63, 614–620 (2017).
5. \*\*Saul, D. et al. Evaluation of Three Forest-Based Bioenergy Development Strategies in the Inland Northwest, United States. *J. For.* (2018). doi:10.1093/jofore/fvy042.
6. \*\*Jacobson, R., Sokhansanj, S, Roeser, D., Hansen, J., Gopaluni, B., Bi, X., Ancillary Impacts of Harvest Residue Pelletization. *Journal of Sustainable Bioenergy Systems* 11(3), 144-155 (2022).
7. \*\*Jacobson, R., Sokhansanj, S, Roeser, D., Hansen, J., Gopaluni, B., Bi, X. A Cost Analysis of Mobile and Stationary Pellet Mills for Mitigating Wildfire Costs. *Journal of Sustainable Bioenergy Systems* 11(3), 131-143 (2022).

## Manuscripts in Progress

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(\*invited, \*\*submitted, competitive)

1. \*\*Jacobson, R., Gholami, O., Sokhansanj, S. An Assessment of Crop Residue Availability, Costs, Energy Input, and Emissions for a Medium Capacity Agri-Pelletization Plant. *Can. J. Biosys. Eng.* (In Review).
2. \*\*Jacobson, R., Ebadian, M., Yazdanpanah, F., Sokhansanj, S. Analysis of Supplying Wood Pellets to Coal-Fired Power Plants in Alberta. *Can. J. Biosys. Eng.* (In Review).

## Presentations

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(\*invited, \*\*submitted, competitive)

1. \*\*Modeling woody biomass utilization for energy feedstock in the northwest United States. Jacobson, R., Keefe, R. (University of Idaho, USA). IUFRO World Congress 2014. Salt Lake City, UT (October 5-11, 2014).
2. Biomass Cofiring in Alberta. Ebadian, M., Jacobson, R., Yazdanpanah, F., Sokhansanj, S. (University of British Columbia, Canada). *Presented At:*
  - \*Wood Pellet Association of Canada Biomass Cofiring Workshop. Edmonton, AB, Canada (May 3-4, 2016).

- \*International Energy Agency Biofuels and BioFuelsNet Canada Workshop. Vancouver, BC, Canada (September 21-22, 2016).
- 3. \*Simulating Biomass Supply and Harvesting for Bioenergy. Jacobson, R. Sokhansanj, S. (University of British Columbia, Canada). Bioproducts Institute Meeting. Vancouver, BC, Canada (September 10, 2018).
- 4. \*\*The Economic Impacts of Expanding the Canadian Pellet Industry. Jacobson, R., Sokhansanj S., and Yazdanpanah, F. Canadian Society of Biological Engineering Annual Meeting. (University of British Columbia, Canada). Vancouver, BC, Canada (July 16, 2019).
- 5. \*Mobile Pelletization to Reduce the Impacts of Wildfires on the Socio-Economics of British Columbia. Jacobson, R. (University of British Columbia, Canada). Presented at the Department of Chemical and Biological Engineering Seminar Series. University of British Columbia (November 6, 2020).

## Skills and Services

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### Computer and Programming Skills

- JavaScript
- Python
- SQL
- Office
- STELLA
- Vensim
- Powersim Studio
- ArcGIS

### Statistics

Experience working with spatial statistics, while developing analyses of GIS data. Experience using statistics to validate analysis results from scenario models and field trials.

### Personnel Management

Managed multiple projects in the forest with multiple employees, testing experimental technologies for forest operations in-situ. The projects had between 3 and 25 employees and were completed on time and on budget.

### Critical Thinking

Created multiple models simulating resource movement, cost and logistics estimation, and production volumes. Ability to simplify complex problems into manageable modules for improved clarity and determining critical factors in production efficiency.

### Services

- Secretary of University of Wyoming Men's Club Soccer team (2011)
- President of University of Wyoming Men's Club Soccer team (2012)

## Memberships

- Clean Energy Research Centre (CERC)
- Society of American Foresters (SAF)

## Awards

- American Nuclear Society-Idaho Chapter scholarship for high school seniors and juniors (2006)
- University of Wyoming- Dean's List (2007, 2008)
- MITACS/NSERC Accelerate Program (2018)
- University of British Columbia- President's Academic Excellence Initiative PhD Award (2018, 2019, 2020, 2021, 2022)

## Language

- English (native)
- German (proficient)

## Work Experience

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University of British Columbia

01/2016-Present

Research Assistant

University of Idaho

09/2013-12/2015

Research Assistant

Teaching Assistant

Forest Engineering and Harvesting (FOR 430)

National Renewable Energy Lab (NREL)

06/2014-09/2014

Intern

- Developed a new woody biomass feedstock logistics and costing model for the Biomass Scenario Model (BSM) in STELLA, documentation updates, and database maintenance using SQL.

Idaho National Lab (INL)

2005-2009

Intern

- Designed and calculated heat flow, waste volumes and costs for using HTGR nuclear reactor for oil sands petroleum extraction using Excel.
- Developed model and interface for proposal (accepted) for biofuel feedstock and infrastructure simulation, including logistics and cost simulation using Excel.

- Designed realistic 3D models for explosives damage simulations to the national strategic infrastructure.
- Researched parallel programming and supercomputing access for coal gasification project simulation needs.
- Programmed and designed additional function for arcGIS to convert map files to .PDF format and save to an online database for public access.