ZIHAOHAN SANG

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EDUCATION

My formal education is in forest and environmental science. I hold a dual Master degree from the University of Freiburg, Germany, and the University of Alberta. My PhD research focuses on sustainable management of natural resources in the face of climate change. I hold a GPA of 4.0 for course work completed at UofA. Currently, I am a postdoctoral researcher in climate change modeling.

- Postdoc fellowship in Climate Change & Impacts — May 2022 - present
  University of Toronto
- PhD in Forest Biology & Management — September 2019 - April 2022
  University of Alberta
- Dual MSc degree in Forest Sciences — September 2016 - June 2019
  University of Alberta and University of Freiburg (Germany)
- BSc in Forest Science, *Honor thesis* — September 2013 - April 2016
  University of British Columbia
- BSc in Agriculture — September 2011 - June 2013
  Nanjing Forestry University (China)

RESEARCH EXPERIENCE & TECHNICAL SKILLS

My career objective is to contribute to sustainable management of natural resources. As such, I like to develop a range of technical skills, but also the necessary communication skills to make an impact beyond academia. The following is a list of accomplishments that I am most proud of.

- Developed a seed planting system Alberta that allows industry and government stakeholders to select species seed sources to plant climate change resilient forests after harvesting: http://ualberta.ca/~zihaohan/alberta3st.
- Collaborated with Alberta Agricultural and Forest Ministry, leading to a jointly authored peer-reviewed paper on how to manage forests under climate change (Publication #3 below).
- Collaborated with German researchers at the Technical University of Munich on resilience of forest trees to drought conditions, leading to a jointly authored peer-reviewed paper (Publication #1 below).
- As part of Honor thesis in the Forestry Department at the University of British Columbia of adaptive capacity of plants to climate.

- Worked as a research assistant in the Molecular Biology lab of the Botany Department at the University of British Columbia to explore the genetic basis of plant-environment interactions.

  • As part of the above activities, I gained deep experience in advanced programming in R, MATLAB, and python languages, as well as in programming interactive, web based applications to serve as front-end for scientific models and databases.

TEACHING

I am passionate about sharing my skills with others, and I have been working on improving formal teaching skills, as well as gaining practice as a Teaching Assistant.

Formal training

- Completed the Graduate Teaching and Learning Program (Level 1-3) at the University of Alberta

Teaching experience

- Teaching assistant for RENR 480 — Fall 2018
  Statistics for the Environmental Sciences.
  Student feedback yielded an overall score of 4.8/5.0
- Teaching assistant for REN R 690 — Winter 2018
  Multivariate Statistics. Student feedback yielded an overall score of 4.8/5.0
- Subsequently selected by the Department Chair as RENR480 primary instructor — Fall 2019
- Invited to give guest lectures on data visualization and data management — Fall 2020

HONORS

While I am fully funded through a Graduate Research Assistant Fellowship through research grants, I am grateful for the additional scholarships and recognitions, listed below.

Scholarships

- Al Brennan Memorial Graduate Scholarship ($15,000) — 2021
- Max MacLaggan Scholarship ($3,000) — 2020
- Anina Hundsdoerfer Memorial Graduate Scholarship ($2,000) — 2020
- FGSR Doctoral Recruitment ($15,000) — 2019
- Desmond I Crossley Memorial Scholarship ($10,000) — 2019
- William H McCardell Memorial Scholarship ($2,700) — 2018

- International Student Scholarship ($10,000) 2016

Recognitions

- I received an award for the best MSc Thesis of 2019 by the Department of Renewable Resources 2019
- My research work was featured in the departmental newsletter to funders, industry partners and stakeholders: https://tinyurl.com/yzngw9gg (page 3) 2019
- I served as reviewer in peer-review journal *climatic change* 2019
- I was on the Dean's Honor Roll, Faculty of Forestry, UBC 2014-2016
- Excellent All-round Student, awarded 3x from Nanjing Forestry University 2011-2013

STUDENT CITIZENSHIP & LEADERSHIP

I am actively involved in community volunteer activities to build connections with others and to improve my communication skills.

- I participated as volunteer organizer for an on-line social science conference (https://congress2021.ca) 2021
- I participate as volunteer field assistant for the Edmonton Area Land Trust (https://www.ealt.ca/), a citizen science organization to spread awareness of conservation 2020
- I worked with Student Union team to welcome new graduate students and organize orientation activities 2019
- I volunteered as mentor for undergraduate students to advise on UofA sustainability issues on social media, and contributed to the UofA sustainability office website: https://sustainsu.wordpress.com 2018

PUBLICATIONS

1. Sang, Z., Sebastian-Azcona, J., Hamann, A., Menzel, A., & Hacke, U. (2019). Adaptive limitations of white spruce populations to drought imply vulnerability to climate change in its western range. *Evolutionary Applications*, *12*(9), 1850-1860. https://doi.org/10.1111/eva.12845
2. Sang, Z., Hamann, A., & Aitken, S. N. (2021). Assisted migration poleward rather than upward in elevation minimizes frost risks in plantations. *Climate Risk Management*, *34*, 100380. https://doi.org/10.1016/j.crm.2021.100380
    - Poster (IURFO, 2021)

3. Sang, Z., & Hamann, A. (2022). Climatic limiting factors of North American ecosystems: a remote-sensing based vulnerability analysis. *Environmental Research Letters*, *17*(9), 094011. https://doi.org/10.1088/1748-9326/ac8608

4. Sang, Z., & Hamann, A. (2023). A record-setting 2021 heat wave in western Canada had a significant temporary impact on greenness of the world's largest protected temperate rainforest. *Remote Sensing*, *15*(8), 2162. https://doi.org/10.3390/rs15082162

5. Sang & Hamann (202X) No-analogue ecological communities since the Last Glacial Maximum inferred from fossil pollen records for North America (submitted, manuscript # ECOG-05017)

6. Sang, Z., Hamann, A., & Rweyongeza, D. (2023). Adapting reforestation programs to observed and projected climate change. *Mitigation and Adaptation Strategies for Global Change*, *28*(2), 14. https://doi.org/10.1007/s11027-023-10050-z

7. Sang et al. (2023). Leveraging the record-breaking 2021 heat dome to advance understanding of ecological responses to extreme heat waves. (in progress).