

CURRICULUM VITAE

STEVE CHHIN (Ph.D.)

University Address:

West Virginia University
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1. RESEARCH INTERESTS

- Quantitative methods in forest ecology, silviculture, and forest management
- Role of silviculture in adaptation to climate change and forest disturbances
- Impact of global change (i.e., increased CO₂, global warming) and disturbances (i.e., insects, fungal pathogens, fire) on forest productivity and regeneration
- Effect of silvicultural practices on wood quality and woody biomass feedstock development for bioenergy and biofuels
- Restoration and management of endangered forest ecosystems
- Fire ecology and management: fuels and fire behavior modelling
- Tree-ring applications (dendrochronology) in forest stand dynamics (dendroecology) and forest growth-climate relationships (dendroclimatology)

2. EDUCATION**(mm/yyyy awarded)**

Ph. D. (Forest Biology and Management) 06/2008
 Department of Renewable Resources, University of Alberta

M. Sc. (Ecology) 10/2003
 Department of Botany, University of Manitoba

B. Sc. (Biology & Biochemistry) 06/2001
 Department of Biology, Center for Forest Interdisciplinary Research,
 University of Winnipeg

3. PROFESSIONAL EXPERIENCES**(mm/yyyy-mm/yyyy)**

West Virginia University, Division of Forestry and Natural Resources 05/2021 – present
 Associate Professor (Tenured): Quantitative Forest Management
 Academic Appointment: Research (45%), Teaching (45%), Service (10%)

West Virginia University, Division of Forestry and Natural Resources Assistant Professor: Quantitative Forest Management Academic Appointment: Research (45%), Teaching (45%), Service (10%)	12/2016 – 05/2021
Michigan State University, Department of Forestry Assistant Professor: Applied Forest Ecology Academic Appointment: Research (60%), Teaching (30%), Service (10%)	07/2008 – 12/2016
University of Alberta, Department of Renewable Resources Graduate Research Assistant: Forest Biology and Management	01/2004 – 06/2008
University of Manitoba, Department of Botany Graduate Research Assistant: Forest Ecology, Silviculture, Fire Ecology	06/2001 – 10/2003
University of Winnipeg, Department of Biology and the Center for Forest Interdisciplinary Research (C-FIR) Research Assistant: Forest Ecology, Silviculture, Fire Ecology	05/2000 – 06/2001

4. PUBLICATIONS, PRESENTATIONS AND CREATIVE WORKS

Note: Peer-reviewed or refereed items are preceded by a “*”. Underlined names indicate graduate student, research assistant, and post-doctoral mentees. Google Scholar H-Index = 15 (Profile Page: <https://scholar.google.com/citations?user=r20HdR0AAAAJ&hl=en>)

4.1. Refereed Journal Articles:

1. * Jiang, Y., Zhang, X., ***Chhin, S.***, and Zhang, J. 2021. A bimodal pattern and age-related growth of intra-annual wood cell development of Chinese fir in subtropical China. *Frontiers in Plant Science*, In Press.
2. * Yetter, E., ***Chhin, S.***, Brown, J.P. 2021. Dendroclimatic analysis of Central Appalachian red spruce in West Virginia. *Canadian Journal of Forest Research*, 51: 1607-1620.
3. * Yetter, E., ***Chhin, S.***, Brown, J.P. 2021. Sustainable management of central Appalachian red spruce. *Sustainability*, 13, Article #10871.
4. * Holden, J., ***Chhin, S.***, Hirsch, A., Yetter, E. 2021. Preliminary assessment of climatic sensitivity of riparian old-growth hemlock. *Mountaineer Undergraduate Research Review*, 6: Article #5 (Available at: <https://researchrepository.wvu.edu/murr/vol6/iss1/5>).
5. * Lu, L., Wang, H., ***Chhin, S.***, Duan, A., Zhang, J., and Zhang, X. 2021. Modelling tree height-diameter allometry of Chinese fir in relation to stand and climate factors through the Bayesian model averaging approach. *Silva Fennica*, 55: Article #10415.
6. * Wang, Z., Zhang, X., ***Chhin, S.***, Zhang, J., and Duan, A. 2021. Disentangling the effects of stand and climatic variables on forest productivity of Chinese fir plantations in subtropical China using a random forest algorithm. *Agricultural and Forest Meteorology*, 304-305: Article #108412.
7. * Premer, M., ***Chhin, S.***, and Zhang, J. 2021. Local calibration of species-specific competition indices in Sierran mixed conifer forests: Application transfer to evolving objectives. *Canadian Journal of Forest Research*, 51: 524-532.

8. * Yetter, E., Brown, J.P., **Chhin, S.** 2021. Anamorphic site index curves for Central Appalachian red spruce in West Virginia, USA. *Forests*, 12: Article #94.
9. * Liu, X., Duan, G., **Chhin, S.**, Lei, X., Wang, D., and Zhang, X. 2021. Evaluation of potential versus realized site productivity of *Larix principis-rupprechtii* plantations across northern China. *Forest Ecology and Management*, 479: Article #118608.
10. * Hayford, I., and **Chhin, S.** 2020a. Influence of climate on oak savanna tree species in the Midwestern United States. *International Journal of Environment and Climate Change*, 10: 7-23.
11. * Hayford, I., and **Chhin, S.** 2020b. Historical ecology to inform restoration of oak savanna in Michigan. *Advances in Environmental Research*, 72: 1-22.
12. * Zhang, X., Wang, Z., **Chhin, S.**, Wang, H., Duan, A., Zhang, J. 2020a. Relative contributions of competition, stand structure, age, and climate factors to tree mortality of Chinese fir plantations: long-term spacing trials in southern China. *Forest Ecology and Management*, 465: Article #118103.
13. * Zhang, X., Wang, H., **Chhin, S.**, and Zhang, J. 2020b. Effects of competition, age and climate on tree slenderness of Chinese fir plantations in southern China. *Forest Ecology and Management*, 485: Article #117815.
14. * Yang, Y., Huang, S., Vassov, R., Pinno, B., and **Chhin, S.** 2020. Climate sensitive height growth models on natural and reclaimed oil sands sites in Alberta, Canada. *Canadian Journal of Forest Research*, 50: 297-307.
15. * Zhu, G., Hu, S., **Chhin, S.**, He, P., and Zhang, X. 2019. Modelling site index of Chinese fir plantations using a random effects model across regional site types in Hunan province, China. *Forest Ecology and Management*, 446: 143-150.
16. * Allen, I., **Chhin, S.**, and Zhang, J. 2019. Fire and forest management in montane forests of the northwestern States and California, USA. *Fire*, 2: Article 17 (19 pages).
17. * Lu, L., Wang, H., **Chhin, S.**, Duan, A., Zhang, J., and Zhang, X. 2019. A Bayesian Model Averaging approach for modelling tree mortality in relation to site, competition and climatic factors for Chinese fir plantations. *Forest Ecology and Management*, 440: 169-177.
18. * Zhang, X., **Chhin, S.**, Lu, L., Duan, A., and Zhang, J. 2019a. Climate-sensitive tree height-diameter allometry for Chinese fir in southern China. *Forestry: An International Journal of Forest Research*, 92: 167-176.
19. * **Chhin, S.**, and Huang, S. 2018. Spatial point-pattern analysis of a population of lodgepole pine. *Journal of Forest and Environmental Science*, 34: 419-428.
20. * David, E., **Chhin, S.**, and Skole, D. 2018. Influence of climate variation on growth of tropical tree species in western Kenya. *International Journal of Environment and Climate Change*, 8: 295-307.
21. * Subedi, M.R., Oli, B.N., Shrestha, S., and **Chhin, S.** 2018. Height-diameter modeling of *Cinnamomum tamala* grown in natural forest in mid-hill of Nepal. *International Journal of Forestry Research*, 2018: Article #6583948.
22. * **Chhin, S.** 2018. Managing red oak (*Quercus rubra* L.) reduces sensitivity to climatic stress. *Journal of Forest and Environmental Science*, 34: 338-351.
23. * **Chhin, S.**, Zalesny Jr., R.S., Parker, W.C., and Brissette, J. 2018. Dendroclimatic analysis of white pine (*Pinus strobus* L.) using long-term provenance test sites across eastern North America. *Forest Ecosystems*, 5: Article #18.

24. * Premer, M., **Chhin, S.**, and Zhang, J. 2017. Alternative approaches to mixed conifer forest restoration: Partitioning the competitive neighborhood. *New Forests*, 48: 801-816.
25. * **Chhin, S.** 2017. Adaptive forest management practices promote resilience of oak forests to future climate change. *Advances in Environmental Research*, 54: 101-116.
26. * Johnson, C., **Chhin, S.**, and Zhang, J. 2017. Effects of climate on competitive dynamics in mixed conifer forests of the Sierra Nevada. *Forest Ecology and Management*, 394: 1-12.

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27. * **Chhin, S.**, and Wang, G. 2016. Climatic sensitivity of a mixed forest association of white spruce and trembling aspen at their southern range limit. *Forests*, 7: Article 235 (12 pages).
28. * Finley, K., and **Chhin, S.** 2016. Forest health management and detection of invasive forest insects. *Resources*, 5: Article 18 (15 pages).
29. * Finley, K., **Chhin, S.**, and Nzokou, P. 2016b. Effects of climate on the radial growth of white ash infested with emerald ash borer. *Forest Ecology and Management*, 379: 133-145.
30. * Finley, K., **Chhin, S.**, Nzokou, P., and O'Brien, J. 2016a. Use of near-infrared spectroscopy as an indicator of emerald ash borer infestation in white ash stem tissue. *Forest Ecology and Management*, 366: 41-52.
31. * **Chhin, S.** 2016. Screening the resilience of short-rotation woody crops to climate change. *Geosciences*, 6: Article 7 (12 pages).
32. * **Chhin, S.**, and O'Brien, J. 2015. Dendroclimatic analysis of red pine affected by Diplodia shoot blight in different latitudinal regions in Michigan. *Canadian Journal of Forest Research*, 45: 1757-1767.
33. * **Chhin, S.** 2015. Impact of future climate change on a genetic plantation of hybrid pine. *Botany*, 93: 397-404.
34. * David, E., **Chhin, S.**, and Skole, D. 2014. Dendrochronological potential and productivity of tropical tree species in Western Kenya. *Tree-Ring Research*, 70: 119-135.
35. * Magruder, M., **Chhin, S.**, Palik, B., and Bradford, J. 2013. Thinning increases climatic resilience of red pine. *Canadian Journal of Forest Research*, 43: 878-889.
36. * **Chhin, S.**, Chumack, K., Dahl, T.A., David, E.T., Kurzeja, P., Magruder, M., Telewski, F.W. 2013. Growth-climate relationships of *Pinus strobus* in a floodway versus terrace forest along the banks of the Red Cedar River, Michigan. *Tree-Ring Research*, 69: 37-47.
37. * Mbow, C., **Chhin, S.**, Sambou, B., and Skole, D. 2013. Potential of dendrochronology to assess annual rates of biomass productivity in savanna trees of West Africa. *Dendrochronologia*, 31: 41-51.
38. * Magruder, M., **Chhin, S.**, Monks, D., and O'Brien, J. 2012. Effects of initial stand density and climate on red pine productivity within Huron National Forest, Michigan. *Forests*, 3: 1086-1103.
39. * Chhin, S., Mbow, C., Sambou, B., and Skole, D. 2011. Growth-climate relationships in savanna trees of West Africa. *Journal of Forestry*, 109: 474.
40. * **Chhin, S.** 2010. Influence of climate on growth of hybrid poplar in Michigan. *Forests*, 1: 209-229.

41. * **Chhin, S.**, Hogg, E.H., Lieffers, V.J., and Huang, S. 2010. Growth-climate relationships vary with height along the stem in lodgepole pine. *Tree Physiology*, 30: 335-345.
42. * **Chhin, S.**, Hogg, E.H., Lieffers, V.J., and Huang, S. 2008a. Potential effects of climate change on the growth of lodgepole pine across diameter size classes and ecological regions. *Forest Ecology and Management*, 256: 1692-1703.
43. * **Chhin, S.**, Hogg, E.H., Lieffers, V.J., and Huang, S. 2008b. Influences of climate on the radial growth of lodgepole pine in Alberta. *Botany*, 86: 167-178.
44. * **Chhin, S.**, and Wang, G.G. 2008. Climatic response of *Picea glauca* seedlings in a forest-prairie ecotone of western Canada. *Annals of Forest Science*, 65: Article No. 207: 8 pages.
45. * **Chhin, S.**, and Wang, G.G. 2007. Growth of white spruce, *Picea glauca*, seedlings in relation to microenvironmental conditions in a forest-prairie ecotone of southwestern Manitoba. *Canadian Field Naturalist*, 121: 191-200.
46. * Wang, G.G., **Chhin, S.**, and Bauerle, W.L. 2006. The effect of natural atmospheric CO₂ fertilization suggested by open-grown white spruce in a dry environment. *Global Change Biology*, 12: 601-610.
47. * **Chhin, S.**, and Wang, G.G. 2005. The effect of sampling height on dendroclimatic analysis. *Dendrochronologia*, 23: 47-55.
48. * **Chhin, S.**, Wang, G.G., and Tardif, J. 2004. Dendroclimatic analysis of white spruce at its southern limit of distribution in the Spruce Woods Provincial Park, Manitoba, Canada. *Tree-Ring Research*, 60: 31-43.
49. * **Chhin, S.**, and Wang, G.G. 2002. Spatial and temporal pattern of white spruce regeneration within mixed-grass prairie in the Spruce Woods Provincial Park of Manitoba. *Journal of Biogeography*, 29: 903-912.

4.2. Refereed Book Chapters:

1. * **Chhin, S.** 2015. Forecasted changes in growth along different regions of the stem under future scenarios of climate change. *In Old-Growth Forests and Coniferous Forests: Ecology, Habitat and Conservation. Edited by R. P. Weber.* Nova Science Publishers, Hauppauge, New York, ISBN: 978-1-63482-369-2, pages 21-36.
2. * **Chhin, S.** 2009. Conceptual and methodological considerations in utilizing tree-rings to derive past history of heavy metal pollution. *In Tree Growth: Influences, Layers and Types. Edited by W.P. Karem.* Nova Science Publishers, Hauppauge, New York, ISBN: 978-1-60741-784-2, pages 121-130.
3. * **Chhin, S.** 2008. Methodological considerations in examining the demographic response of tree populations to drought stress. *In Droughts: Causes, Effects and Predictions. Edited by J.M. Sanchez.* Nova Science Publishers, Hauppauge, New York, ISBN: 978-1-60456-285-9, pages 219-236.

4.3. Other Refereed Publications:

Prior to WVU

1. * Handler, S.; Duveneck, M. J.; Iverson, L.; Peters, E.; Scheller, R. M.; Wythers, K. R.; Brandt, L.; Butler, P.; Janowiak, M.; Swanston, C.; Clark Eagle, A.; Cohen, J. G.; Corner, R.; Reich, P. B.; Baker,

- T.; **Chhin, S.**; Clark, E.; Fehringer, D.; Fosgitt, J.; Gries, J.; Hall, K. R.; Hall, C.; Heyd, R.; Hoving, C. L.; Ibanez, I.; Kuhr, D.; Matthews, S.; Muladore, J.; Nadelhoffer, K.; Neumann, D.; Peters, M.; Prasad, A.; Sands, M.; Swaty, R.; Wonch, L.; Daley, J.; Davenport, M.; Emery, M. R.; Johnson, G.; Johnson, L.; Neitzel, D.; Rissman, A.; Rittenhouse, C.; and Ziel, R. 2014. *Michigan Forest Ecosystem Vulnerability Assessment and Synthesis: A report from the Northwoods Climate Change Response Framework*. Gen. Tech. Rep. NRS-129. Newtown Square, PA; U.S. Department of Agriculture, Forest Service, Northern Research Station, 229 pages.
2. * **Chhin, S.**, Mbow, C., Sambou, B., and Skole, D. 2011. Growth-climate relationships in savanna trees of West Africa. *Journal of Forestry*, 109: 474.

4.4. Other Publications (Not Peer Reviewed):

Prior to WVU

1. **Chhin, S.** 2016d. In Memoriam of Dave Wright, former President of the Michigan Forest Foundation. *Michigan Forests*, 38 (4): 5.
2. **Chhin, S.** 2016c. Honoring Bill and Alice Botti for their past contributions to the foundation. *Michigan Forests*, 38 (3): 5, 13.
3. **Chhin, S.** 2016b. Supporting outdoor forestry education for public schools. *Michigan Forests*, 38 (2): 5, 13.
4. **Chhin, S.** 2016a. Supporting forest management plans for educational organizations. *Michigan Forests*, 38 (1): 5.
5. **Chhin, S.** 2015d. Recognizing Michigan educators: MFF educator awards. *Michigan Forests*, 37: (4): 5, 14.
6. **Chhin, S.** 2015c. Summer Forestry Workshop for 3rd-12th Grade School Teachers. *Michigan Forests*, 37 (3): 5.
7. **Chhin, S.** 2015b. Supporting student attendance of Michigan SAF meetings. *Michigan Forests*, 37 (2): 5, 16.
8. **Chhin, S.** 2015a. US Capitol Christmas Tree Event. *Michigan Forests*, 36 (1): 5,7.
9. **Chhin, S.** 2014d. Supporting demonstration forests: Seeing is Believing. *Michigan Forests*, 35 (4): 5, 8.
10. **Chhin, S.** 2014c. Supporting student scholarships and continuing education. *Michigan Forests*, 35 (3): 6, 17.
11. **Chhin, S.** 2014b. Supporting forest education and management plans. *Michigan Forests*, 35 (2): 6.
12. **Chhin, S.** 2014a. Promoting sustainable forest management plans. *Michigan Forests*, 35 (1): 6, 18.
13. **Chhin, S.** 2013d. Acknowledging donor support for educational activities that promote sustainable forest management. *Michigan Forests*, 34 (4): 6.
14. **Chhin, S.** 2013c. Promoting teacher's education. *Michigan Forests*, 34 (3): 6.
15. **Chhin, S.** 2013b. Promoting forest science. *Michigan Forests*, 34 (2): 6.
16. **Chhin, S.** 2013a. Michigan Forest Foundation. *Michigan Forests*, 34 (1): 6.

17. **Chhin, S.**, Hogg, E.H., Lieffers, V.J., and Huang, S. 2008. Climate and growth of lodgepole pine in Alberta. Centre for Enhanced Forest Management (EFM), Advances in Forestry Research, Department of Renewable Resources, University of Alberta, EFM Research Note #01/08.

4.5. Refereed Journal Articles Submitted

1. * Grey, J., Schuler, J., Thomas-Van Gundy, M., and Chhin, S. 2021. Reference curves for central Appalachian red spruce. Submitted to Canadian Journal of Forest Research (Submitted: 09/24/21, Revisions Requested: 10/28/21, Manuscript #: cjfr-2021-0262)

4.6. Conference Proceedings:

1. * Yetter, E., Brown, J., **Chhin, S.** 2020. Anamorphic site index curves for Central Appalachian red spruce in West Virginia, USA. *Proceedings of the 2020 CASRI (Central Appalachian Spruce Restoration Initiative) Partnership Virtual Conference*. Conference Theme: Measuring Restoration Success, 4-5 November 2020.
2. * Yetter, E., **Chhin, S.**, Brown, J. 2020. Dendroclimatic analysis of Central Appalachian red spruce. *Proceedings of the 2020 CASRI (Central Appalachian Spruce Restoration Initiative) Partnership Virtual Conference*. Conference Theme: Measuring Restoration Success, 4-5 November 2020.
3. * Yetter, E., **Chhin, S.**, Brown, J. 2019. Growth climate analysis of red spruce (*Picea rubens*) in Central Appalachian forests. *Proceedings of the 2019 National Convention of the Society of American Foresters*. Conference Theme: Forest Policy and Science-Management Interactions, 30 October 2019-3 November 2019, Louisville, KY.
4. * Finley, K., and **Chhin, S.** 2018. Dendroclimatic response of jack pine affected by *Diplodia pinea* shoot blight. *Proceedings of the 2018 National Convention of the Society of American Foresters*. Conference Theme: Forest Policy and Science-Management Interactions, 3-7 October 2018, Portland, Oregon.
5. * Allen, I., **Chhin, S.**, Zhang, J. 2018. Evaluating post-fire plantation restoration in the mixed conifer forests of the Sierra Nevada. *Proceedings of the 2018 National Convention of the Society of American Foresters*. Conference Theme: Forest Policy and Science-Management Interactions, 3-7 October 2018, Portland, Oregon.
6. * **Chhin, S.**, Zalesny Jr., R.S., Parker, W.C., and Brissette, J. 2017. Dendroclimatic analysis of white pine (*Pinus strobus*) provenance trials across eastern North America including the United States and Canada. 2017. *Presented at Inaugural Global Forest Biodiversity Initiative Conference & GFBI-FECS Joint Symposium: Forest Research in the Big Data Era*. 6-9 September 2017, Beijing, China.
7. * Allen, I., **Chhin, S.**, and Zhang, J. 2017. Evaluating post-fire restoration in the mixed conifer forest of the Sierra Nevada using plantations. *Proceedings of Forest Regeneration in Changing Environments*. 11-13 July 2017, Corvallis, Oregon.
8. * **Chhin, S.**, and Wang, G.G. 2017. Climate change and weather impacts on aspen forest communities in the parkland and prairie region of southern Manitoba. *Proceedings of the 11th North American Forest Ecology Workshop: Sustaining Forests: From Restoration to Conservation*, 19-22 June, Edmonton, Canada.
9. * Johnson, C., **Chhin, S.**, and Zhang, J. 2017. Fuels and fire behavior in mixed-conifer forests of the Sierra Nevada. *Proceedings of the 11th North American Forest Ecology Workshop: Sustaining Forests: From Restoration to Conservation*, 19-22 June, Edmonton, Canada.

10. * Liborius, R., **Chhin, S.**, Mbow, C., and Skole, D. 2017. Allometric relationships to determine age in tropical forests: Towards improved estimates of annual rates of carbon sequestration. *Proceedings of the 11th North American Forest Ecology Workshop: Sustaining Forests: From Restoration to Conservation*, 19-22 June, Edmonton, Canada.
11. Zhang, J., Allen, I., Subedi, M., and Chhin, S. 2017. Post-fire management regimes on plantation growth and development: Can we find effective tools to quickly restore a resilient forest. *Amador-Calaveras Consensus Group Monitoring and Science Symposium Highlights*, USDA Forest Service, pp. 26-27.

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12. * Finley, K., **Chhin, S.**, and Nzokou, P. 2016. Effects of climate on the radial growth of white ash infested with emerald ash borer. *Proceedings of the 2016 National Convention of the Society of American Foresters*. Conference Theme: Our Transcontinental Land Ethic: Exploring the Differences that Unite Us, 2-6 November 2016, Madison, Wisconsin.
13. * Johnson, C., **Chhin, S.**, Zhang, J., and Allen, I. 2016. Effects of climate on competition in mixed conifer forests of the Sierra Nevada of northern California. *Proceedings of the 2016 National Convention of the Society of American Foresters*. Conference Theme: Our Transcontinental Land Ethic: Exploring the Differences that Unite Us, 2-6 November 2016, Madison, Wisconsin.
14. * Hayford, I., and **Chhin, S.** 2016. Historical ecology to inform restoration of oak savanna in Michigan. *Proceedings of the 2016 National Convention of the Society of American Foresters*. Conference Theme: Our Transcontinental Land Ethic: Exploring the Differences that Unite Us, 2-6 November 2016, Madison, Wisconsin.
15. * Minnix, K., **Chhin, S.**, and O'Brien, J. 2016. Distribution of *Matsucoccus macrocitrices* in Michigan. *Proceedings of the 2016 National Convention of the Society of American Foresters*. Conference Theme: Our Transcontinental Land Ethic: Exploring the Differences that Unite Us, 2-6 November 2016, Madison, Wisconsin.
16. * Finley, K., **Chhin, S.**, Nzokou, P., and O'Brien, J. 2016. Near-infrared spectroscopy: A non-destructive method for detection of emerald ash borer in white ash stem tissue. *Proceedings of the 101st Annual Meeting of the Ecological Society of America: Novel Ecosystems in the Anthropocene*, 7-12 August, Fort Lauderdale, Florida.
17. * **Chhin, S.**, Finley, K., and O'Brien, J. 2013. Dendroecological analysis of the effects of climatic factors, intraspecific competition, and Diplodia shoot blight on the growth of red pine and jack pine forests. *Proceedings of the 98th Annual Meeting of the Ecological Society of America: Sustainable pathways*, 4-9 August, Minneapolis, Minnesota.
18. * Magruder, M., **Chhin, S.**, Palik, B., and Bradford, J. 2013. The role of thinning in managing red pine for climatic resiliency in Michigan. *Proceedings of the 9th North American Forest Ecology Workshop: Piecing together the Fragments*, 16-20 June, Bloomington, Indiana.
19. * Magruder, M., **Chhin, S.**, Monks, D., and O'Brien, J. 2013. Effects of initial stand density and climate on red pine productivity within Huron National Forest, Michigan, USA. *Proceedings of the 9th North American Forest Ecology Workshop: Piecing together the Fragments*, 16-20 June, Bloomington, Indiana.
20. * **Chhin, S.**, Mbow, C., Sambou, B., and Skole, D. 2011. Growth-climate relationships in savanna trees of West Africa. *Proceedings of the Society of American Foresters National Convention: International Year of the Forests: Linking global, Regional, and Local Solutions*, 2-6 November, Honolulu, Hawaii.

21. * **Chhin, S.** 2011. The role of silviculture in managing red oak for climatic resiliency. *Proceedings of the 8th North American Forest Ecology Workshop: Forest Ecology in a Managed Landscape*, 19-23 June, Roanoke, Virginia.
22. * **Chhin, S.** 2011. Climatic sensitivity in a genetic plantation of hybrid pine in Michigan. *Proceedings of the 8th North American Forest Ecology Workshop: Forest Ecology in a Managed Landscape*, 19-23 June, Roanoke, Virginia.
23. * **Chhin, S.** 2010. Adaptation to climate change: Identification of climatically resilient hybrid poplar cultivars. *Proceedings of the 8th Biennial Short Rotation Woody Crops Operations Working Group: Short Rotation Woody Crops in a Renewable Energy Future (Challenges and Opportunities)*, 17-19 October, Syracuse, New York.
24. * **Chhin, S.**, Hogg, E.H., Lieffers, V.J., and Huang, S. 2009. Differential responses to climate at different heights along the stem: implications for growth projections under future climate change scenarios. *Proceedings of Carbon in Northern Forests: Integration of Research and Management*, 10-11 June 2009, Traverse City, Michigan.
25. * **Chhin, S.**, Hogg, E.H., Lieffers, V.J., and Huang, S. 2007. Growth – climate relationships of lodgepole pine across competitive classes and elevational ecoregions in Alberta, Canada. *Proceedings of the 6th North American Forest Ecology Workshop: 'From Science to Sustainability'*, 18-20 June 2007, Vancouver, British Columbia.
26. * **Chhin, S.**, and Wang, G.G. 2007. Climatic response of white spruce seedlings in a forest-prairie ecotone of southwestern Manitoba, Canada. *Proceedings of the 6th North American Forest Ecology Workshop: 'From Science to Sustainability'*, 18-20 June 2007, Vancouver, British Columbia.
27. * **Chhin, S.**, and Wang, G.G. 2004. The effect of microsite environment on the growth of white spruce seedlings at their southern limit of distribution in south-western Manitoba, Canada. *Proceedings of the Joint 2004 Annual General Meeting and Convention of the Canadian Institute of Forestry and the Society of American Foresters*, 2-6 October 2004, Edmonton, Alberta.
28. * Wang, G.G., **Chhin, S.**, and Bauerle, W. 2004. The effect of natural atmospheric CO₂ fertilization suggested by open-grown white spruce in a dry environment. *Proceedings of the 89th Annual Meeting of the Ecological Society of America (ESA)*, 1-7 August 2004, Portland, Oregon.
29. * **Chhin, S.**, Wang, G.G., and Tardif, J. 2002. Dendroclimatic analysis of white spruce at its southern limit of distribution in the Spruce Woods Provincial Park, Manitoba, Canada. *Proceedings of the 6th International Conference on Dendrochronology: 'Dendrochronology, Environmental Change and Human History'*, 22 – 27 August 2002, Quebec City, Quebec.

4.7. Conference Presentations:

1. **Chhin, S.**, Copenheaver, C., Evans, M., Juday, G., Shumaker, K., van de Gevel, S. 2018. Forest resilience to climate change: A dendroclimatic assessment of trees with commercial and conservation value. Presented at 2018 USDA-NIFA Climate and Agroecology Project Directors' Meeting. 6-7 December 2018, Washington, DC.
2. Allen, I., **Chhin, S.**, Zhang, J. 2018. Evaluating plantation restoration in the mixed conifer forests of the Sierra Nevada. Presented at Maryland/Delaware Society of American Foresters. Conference Theme: Forestry's Future: Students & Technology, 1 November 2018, Cumberland, Maryland.
3. Zhang, J., Allen, I., Subedi, M., and **Chhin, S.** 2017. Post-fire management regimes on plantation growth and development: Can we find effective tools to quickly restore a resilient forest. Presented at Amador-Calaveras Consensus Group Monitoring and Science Symposium. 8 November 2017, Jackson, California.

4. **Chhin, S.** 2017. Using acoustic tomography to infer stem wood quality of pine forests affected by a fungal pathogen. *Presented* at the 2017 West Virginia Division of the Society of American Foresters Spring Meeting. April 2017, Glenville State College, West Virginia.

Prior to WVU

5. Minnix, K., and **Chhin, S.** 2016. White pine decline. *Presented* at the Forestry Department's 5th Annual Graduate Student Research Symposium, 11 February, East Lansing, Michigan.
6. Finley, K., and **Chhin, S.** 2015. Use of dendrochronological techniques for assessment of ash decline due to emerald ash borer infestation. *Presented* at the MSU Council of Graduate Students Graduate Academic Conference, 27 February, East Lansing, Michigan.
7. Johnson, C., and **Chhin, S.** 2015. Restoration of mixed-conifer forests in the Sierra Nevada. *Presented* at the Forestry Department's 4th Annual Graduate Student Research Symposium, 12 February, East Lansing, Michigan.
8. **Chhin, S.**, Finley, K., and O'Brien, J. 2014. Effects of *Diplodia* shoot blight on red pine and jack pine forests in Michigan. *Presented* at the 2014 Forest Health Monitoring (FHM) Workgroup Meeting, 24-27 March, Jacksonville, Florida.
9. Finley, K., and **Chhin, S.** 2014. Portable field-based application of non-destructive technologies For rapid, early detection of emerald ash borer. *Presented* at the Forestry Department's 3rd Annual Graduate Student Research Symposium, 12 February, East Lansing, Michigan.
10. David, E., **Chhin, S.**, and Skole, D. 2012. Tropical dendrochronology in Western Kenya. *Presented* at the Forestry Department's 1st Annual Graduate Student Research Symposium, 23 March, East Lansing, Michigan.
11. Magruder, M., and **Chhin, S.** 2012. Effects of forest management and climate on red pine productivity. *Presented* at the Forestry Department's 1st Annual Graduate Student Research Symposium, 23 March, East Lansing, Michigan.
12. **Chhin, S.** 2010. Climatically resilient hybrid poplar clones for woody biomass feedstock development. *Presented* at Climate Change Vulnerabilities and Opportunities: Michigan and Beyond, 26-27 April, East Lansing, Michigan.
13. **Chhin, S.**, and Willis, J. 2009. Tree-ring analyses of red oak under shelterwood management and interactions with climate. *Presented* at 2009 Michigan Society of American Foresters Fall Meeting: Managing Oak as a Component of Northern Forests, 20-21 October, Grayling, Michigan.
14. **Chhin, S.**, Hogg, E.H., Liefers, V.J., and Huang, S. 2007. Radial growth-climate relationships of lodgepole pine in Alberta. *Presented* at the 57th Forest Industry Lecture Series, Department of Renewable Resources, University of Alberta, 8 March 2007, Edmonton, Alberta. (Awarded as one of the top three posters).
15. **Chhin, S.**, Wang, G.G., and Tardif, J. 2003. Dendroclimatic analysis of white spruce at its southern limit of distribution in the Spruce Woods Provincial Park, Manitoba, Canada. *Presented* at the 37th Prairie Universities Biological Symposium (P.U.B.S.), 21 – 22 February 2003, Winnipeg, Manitoba.
16. **Chhin, S.**, Wang, G.G., and Tardif, J. 2002. Dendroclimatic analysis of white spruce at its southern limit of distribution in the Spruce Woods Provincial Park, Manitoba, Canada. *Presented* at the 1st Parks and Protected Areas Research Forum of Manitoba (PPARFM) 2002 Conference: 'Inside the Outside: Managing Backcountry Recreation Forum', 18 September 2002, Winnipeg, Manitoba.
17. * **Chhin, S.**, Wang, G.G., Staniforth, R.J., and Tardif, J. 2001. The population dynamics of white spruce islands in the Spruce Woods Provincial Park, Manitoba. *Presented* at the 6th Prairie Conservation and Endangered Species Conference: 'Sharing Common Ground', 22 – 25 February 2001, Winnipeg, Manitoba.

4.7. Professional Presentations:

1. **Chhin, S.** 2019. Using silviculture to bolster forest resiliency to climate stressors. Presented at What is a resilient forest? Organized by Dr. Dave McGill (WVU Extension Service). 17 October 2019, Flatwoods, WV.

Prior to WVU

2. **Chhin, S.** 2016. Fire. Eyes on the Forest & Woodland Stewardship Workshop. Organized by Michigan Forest Association and Michigan State University Extension. East Lansing, 7 March 2016.
3. **Chhin, S.** 2013. (Expert Panelist). ESPP Workshop: National Science Foundation Funding. Organized by: MSU ESPP (Environmental Science and Policy Program). Purpose of meeting: Discussion panel on the most recent National Science Foundation Grants Conference. MSU faculty who attended this conference shared their experience and advice on the best methods for securing NSF funding. September 12, East Lansing, MI.
4. **Chhin, S.** 2012. (Expert Panelist). Michigan Vulnerability Assessment Workshop. Organized by: Northern Institute of Applied Climate Science, USDA Forest Service. Purpose of meeting: Synthesize information on climate change projections, impact models, and professional expertise to assess the vulnerability of forest ecosystems in MI to climate change. 5 & 6 September 2012; University of Michigan Biological Station, Pellston, MI.
5. **Chhin, S.** 2011. Adapting forests to climate change: The role of silviculture and tree improvement. Ontario Ministry of Natural Resources, Ontario Forest Research Institute, Sault Ste. Marie, Ontario, Canada, 30 August 2011.
6. **Chhin, S.** 2010. Adaptation to climate change: Early detection of vulnerabilities of forests to climatic stress via tree-ring analysis. USDA Forest Service, Northern Research Station, Grand Rapids, MN, 29 June 2010.
7. **Chhin, S.** 2009. Climatic sensitivity in closed-canopy and open-canopy forests. Department of Forestry, Michigan State University, Hanover Seminar Series, 17 November 2009.

4.7. Artistic and Creative Endeavors:Prior to WVU

1. **Inner Cover Photo in Journal Issue (Page 2) in Connection with Following Article:** David, E., Chhin, S., and Skole, D. 2014. Dendrochronological potential and productivity of tropical tree species in Western Kenya. *Tree-Ring Research*, 70: 119-135.
2. **Inner Cover Photo in Journal Issue (Page 2) in Connection with Following Article:** Chhin, S., Wang, G.G., and Tardif, J. 2004. Dendroclimatic analysis of white spruce at its southern limit of distribution in the Spruce Woods Provincial Park, Manitoba, Canada. *Tree-Ring Research*, 60: 31-43.

5. RESEARCH GRANTS AND SUPPORT

Note: PI = Principal Investigator.

Grant Title	Funding Agency	Investigators	Grant Period	Total Funding (Dr. Chhin Amount)
Management of forest canopy cover and stand density in the Storrie Fire	USDA Forest Service, Pacific Southwest Station	S. Chhin (PI)	07/2019-06/2024	\$129,865 (\$129,865)
Modeling site index of red spruce (<i>Picea rubens</i>) within a changing climate	USDA Forest Service, Northern Research Station	S. Chhin (PI)	06/2017-05/2021	\$33,500 (\$33,500)
Post-fire restoration and management of young plantations in the Sierra Nevada	USDA Forest Service, Pacific Southwest Station	S. Chhin (PI)	04/2017-08/2019	\$105,500 (\$105,500)
Forest resilience to climate change	USDA AFRI (Agriculture and Food Research Initiative)	C.Copenheaver (PI) S. Chhin M. Evans G. Juday K. Shumaker S. Van de Gevel	02/2017-02/2019	\$427,500 (\$47,872.12)
<u>Prior to WVU</u>				
Post-fire restoration and management of young plantations in the Sierra Nevada	USDA Forest Service	S. Chhin (PI)	09/2016-12/2016	\$12,500 (\$12,500)
Fire behavior, fire safety, and firefighting equipment	MSU Teaching and Learning Environment (TLE) Funds	S. Chhin (PI) J. Miesel D. MacFarlane L. Brudvig	07/2016-06/2017	\$36,376 (\$9,094)
Portable gas analyzer	MSU TLE Funds	J. Miesel (PI) S. Chhin R. Kobe D. MacFarlane P. Nzokou D. Rothstein S. Stark M. Walters P. Zarnetske	07/2016-06/2017	\$68,473 (\$7,608)
Portable X-ray fluorescence instrument	MSU AgBioResearch	J. Miesel (PI) S. Chhin R. Kobe D. MacFarlane P. Nzokou D. Rothstein	03/2016-02/2017	\$60,000 (\$7,500)

		M. Walters P. Zarnetske		
Forest resilience to climate change: A dendroclimatic assessment of trees with commercial and conservation value	USDA AFRI (Agriculture and Food Research Initiative)	C. Copenheaver (PI) S. Chhin M. Evans G. Juday K. Shumaker S. Van de Gevel	03/2016- 12/2016	\$427,500 (\$23,127.88)
Effects of climate change on the productivity and ecological genetics of white pine in northern forest ecosystems	USDA Forest Service	S. Chhin (PI)	09/2014- 12/2017	\$20,000 (\$20,000)
Early detection of emerald ash borer using non-destructive technologies	MSU-Project Green	S. Chhin (PI) P. Nzokou	05/2014- 04/2015	\$16,500 (\$9,900)
Restoration of mixed-conifer forest in the Sierra Nevada of California: quantifying radius distance for release of large trees	USDA Forest Service	S. Chhin (PI) R. Yin	03/2014- 08/2017	\$253,454 (\$152,072)
White pine decline in the Great Lakes region	USDA Forest Service	S. Chhin (PI)	08/2014- 12/2016	\$79,715 (\$79,715)
Development of non-destructive technologies for rapid, early detection of emerald ash borer	MSU-Project Green	S. Chhin (PI) P. Nzokou	05/2013- 04/2014	\$14,750 (\$8,850)
NSF Grants Conference: Travel Grant	MSU ESPP	S. Chhin (PI)	03/2013	\$1,375 (\$1,375)
Portable field-based application of non-destructive technologies for rapid, early detection of emerald ash borer	USDA Forest Service	S. Chhin (PI) P. Nzokou	08/2012- 08/2016	\$105,000 (\$63,000)
Dendroclimatic analysis of the effects of drought and other climatic factors on growth and mortality rates in pine forests affected by <i>Diplodia</i> shoot blight	USDA Forest Service	S. Chhin (PI)	08/2011- 07/2014	\$60,000 (\$60,000)
A dendrochronological approach for determining the impact of climatic change on oak savanna	Global Forest Society	S. Chhin (PI)	04/2010- 12/2016	\$1,800 (\$1,800)
Near Infra-Red Spectrophotometer	MSU MAES Equipment Grant	S. Chhin (PI)	05/2009- 04/2010	\$12,000 (\$12,000)
Set of Equipment to Measure Carbon in Forest Ecosystems	MSU MAES Equipment Grant	R. Kobe (PI) A. Finley D. Rothstein M. Walters D. MacFarlane S. Chhin	05/2009- 04/2010	\$64,149 (\$10,692)

Carbon Benefits Project: Carbon, conservation, and livelihoods	World Wildlife Fund, Global Environmental Facility	D. Skole (PI) B. Simpson D. MacFarlane S. Chhin	08/2008-03/2011	\$995,011 (\$99,501)
Graduate Scholarship	Prairie Adaptation Research Collaborative	S. Chhin (PI)	03/2006-02/2007	\$10,000 (\$10,000)
Honorary Izaak Walton Killam Memorial Scholarship & Research Grant	Killam Trusts	S. Chhin (PI)	09/2005-06/2008	\$13,983 (\$13,983)
Ph.D. Scholarship & Research Grant	Alberta Ingenuity Fund	S. Chhin (PI)	05/2005-06/2008	\$62,833 (\$62,833)
Canada Graduate Scholarship	Natural Sciences and Engineering Research Council of Canada (NSERC)	S. Chhin (PI)	01/2004-12/2005	\$70,000 (\$70,000)
Postgraduate Scholarship	NSERC	S. Chhin (PI)	05/2001-04/2003	\$34,600 (\$34,600)
Total Cumulative Funding				\$2,688,884 (\$1,086,888)
Total Funding at WVU				\$696,365 (\$316,737.12)

6. TEACHING EXPERIENCE

6.1 . UNDERGRADUATE AND GRADUATE INSTRUCTION

West Virginia University, Division of Forestry and Natural Resources:

- Forest Management (FMAN 593B): Fall 2021
- Forest Management (FMAN 433): Fall 2018 – Fall 2021
- Elements of Silviculture (FOR 310): Fall 2017 – Fall 2021
- Forest Mensuration (FMAN 222): Spring 2017 – Spring 2021
- Forest Management Planning (FMAN 434): Spring 2020-Spring 2021
- Forest Resources Management Field Practice (FMAN 400): Summer 2018 – Summer 2021
- Elements of Silviculture (FOR 593A): Fall 2019
- Dendrochronology (FMAN 593): Fall 2017, Spring 2019, Spring 2021
- Montane Forest Management (FMAN 693): Spring 2017

Michigan State University, Department of Forestry:

- Wildland Fire (FOR 412): Fall 2009, Spring 2013-2016
- Introduction to Forestry (FOR 202), Fall 2013, Spring 2015-2016
- Forestry Field Studies (FOR 420): Summer 2014-2016
- Silviculture (FOR 406): Spring 2009-2010

- Independent Study in Forestry (FOR 490): Fall 2010, Summer 2016
- Dendrochronology (FOR 890): Fall 2011, Spring 2015

7. ADVISING AND COMMITTEES

7.1. GRADUATE STUDENTS: MAJOR ADVISOR

- **Kathleen Conroy** (Ph.D. Student, West Virginia University) 08/2020 – present
Thesis topic: Management of forest canopy cover and stand density in the Storrie fire
- **Andrew Hirsch** (M.S. Student, West Virginia University) Graduated 2021
Thesis topic: Dendroecological reconstruction of historical stand structure and climatic sensitivity in Lassen National Forest
- **Eric Yetter** (M.S. Student, West Virginia University) Graduated 2020
Thesis topic: Dendroclimatic analysis and site index modeling of Central Appalachian red spruce
- **Iris Allen** (M.S. Student, West Virginia University) Graduated 2019
Thesis topic: Evaluating post-fire plantation restoration in a mixed conifer forest in the Sierra Nevada
- **Isaac Hayford** (M.S. Student, MSU) Graduated 2017
Thesis topic: Effect of management and climate on oak productivity

Prior to WVU

- **Reinardus Cabuy Liborius** (M.S. Student, MSU) Graduated 2016
Thesis topic: Allometric relationships of tropical tree species in Indonesia and Senegal
- **Christal Johnson** (M.S. Student, MSU) Graduated 2016
Thesis topic: Climate effects on fire and competitive dynamics in mixed-conifer forests of the Sierra Nevada
- **Kaelyn Finley** (M.S. Student, MSU) Graduated 2015
Thesis topic: Dendrochronology and near-infrared spectroscopy (NIR) of white ash infested by emerald ash borer in Michigan
- **Matthew Magruder** (M.S. Student, MSU) Graduated 2012
Thesis topic: Effects of forest management and climate on productivity of red pine in Michigan
- **Eric David** (M.S. Student, MSU) Graduated 2012
Thesis topic: Effects of climate on productivity of tropical tree species in western Kenya

7.2. GRADUATE STUDENTS: GUIDANCE COMMITTEE

- **Luis Guillen** (Ph.D. Student, West Virginia University) Graduated 2021
- **Scott Warner** (Ph.D. Student, MSU) Graduated 2021
- **Joseph Gray** (M.S. Student, West Virginia University) Graduated 2020
- **Aaron Lutz** (M.S. Student, West Virginia University) Graduated 2018
- **James Watson** (Ph.D. Student, West Virginia University) Graduated 2018
- **Ismail Koc** (Ph.D. Student, MSU) Graduated 2018

Prior to WVU

- | | |
|---|----------------|
| ▪ Zhonglei Wang (Ph.D. Student, MSU) | Graduated 2012 |
| ▪ Kojo Afrifah (Ph.D. Student, MSU) | Graduated 2012 |
| ▪ Yingqian Lin (M.S. Student, MSU) | Graduated 2012 |
| ▪ Ismail Koc (M.S. Student, MSU) | Graduated 2012 |

7.3. POSTDOCTORAL RESEARCH ASSOCIATES

- | | |
|---|-------------------|
| ▪ Dr. Michael Premer | 02/2016 – 02/2017 |
| Project topic: Restoration of mixed-conifer forest in the Sierra Nevada of California | |

7.4. RESEARCH ASSISTANT ADVISING

- **Natalie Pawlikowski** (Fall 2018 - Spring 2019)
- **Iris Allen** (Spring 2016 – Fall 2016)
- **Andrew Monks** (Summer 2012 – Fall 2012)

7.5. UNDERGRADUATE STUDENT RESEARCH ADVISING

- **John Holden** (Summer 2019 - present)
- **Donald Albright** (Summer 2018)
- **Kevin Nixon** (Summer 2018)
- **Simeon Spottswood** (Spring 2018 - Summer 2018)
- **Stephi Dickinson** (Summer 2017)
- **Ryan Micklus** (Fall 2015 - Fall 2016)
- **Matthew Dziadosz** (Summer 2016)
- **Emily Caretti** (Fall 2015 - Summer 2016)
- **Lucas Vonder Linden** (Summer 2015)
- **Jomar Magalhaes** (Summer 2015)
- **Brie-Anne Breton** (Spring 2014)
- **Patrick Shults** (Spring 2014)
- **Justin Brabon** (Fall 2012 to Fall 2013)
- **Devin Berry** (Summer 2011 to Fall 2013)
- **Russell Black** (Spring 2012)
- **Molley Rooney** (Fall 2011)
- **Ragini Bhadula** (Spring 2009)

7.6. HIGH SCHOOL STUDENT ADVISING

- **Richard Kim** (Summer 2016)
- **Marisol Robles** (Summer 2016)