

DIANA L. SIX, Professor of Forest Entomology and Pathology

Department of Ecosystem and Conservation Sciences
Systems Ecology Faculty
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Areas of specialization:

Ecology and evolution of bark/ambrosia beetle-fungus symbioses; effects of exotics and climate change on symbioses, the ecology and management of bark beetles including interactions with pathogens, fire, and climate change; forest adaptation to climate change; science communication; science journalism

QUALIFICATIONS

Chair: Department of Ecosystem and Conservation Sciences, The University of Missoula, MT, 2013 to 2016

Professor: 2007 to present. Department of Ecosystem and Conservation Sciences, College of Forestry and Conservation, University of Missoula, MT

Associate Dean of Graduate Programs: 2008-2010. College of Forestry and Conservation, University of Missoula, MT

Associate Professor: 2002-2007 Department of Ecosystem and Conservation Sciences, College of Forestry and Conservation, University of Missoula, MT 59812

Assistant Professor: 11/1997 to 10/2002. School of Forestry, University of Missoula, MT 59812

Postdoctoral Researcher: 1997. University of California, Berkeley, Department of Environmental Science, Policy and Management - Chemical Ecology

Editor: Western Journal of Applied Forestry (Subject area: Forest insects and disease) 2007-2013

Editor: Insects 2010 – present

Editor: Symbiosis (Subject area: Insect-microbial symbioses, climate change) 2010 – 2015

Guest Editor: Insects 2011, Insect Symbiosis as Innovation, special edition, two volumes

Editor: Journal of Economic Entomology (Subject area: Forest entomology) 2011-2016

Editor: Agricultural and Forest Entomology (Subject area: Forest entomology, climate change) 2014-present

Enrolled in MS program in Environmental and Natural Resource Journalism, University of Montana – expected completion spring 2020. *Thesis:* A journalistic portfolio on elder activism and climate change.

Ph.D. Entomology: 1997, University of California, Riverside, Department of Entomology

Dissertation title: "Investigations on the ecology, population genetics, and evolution of *Dendroctonus*/mycangial fungus associations with an emphasis on the *Dendroctonus jeffreyi* and *D. ponderosae* systems".

Focus: Forest Entomology
Minor: Mycology/Plant Pathology

Advisor: Timothy Paine
Minor advisor: John Menge

M.S. Entomology: 1992, University of California, Riverside, Department of Entomology
Thesis title: "Seasonal prevalence of *Entomophthora muscae* and introduction of *Entomophthora schizophorae* (Zygomycotina: Entomophthorales) into *Musca domestica* (Diptera: Muscidae) populations on California dairies."

Focus: Insect Pathology/Biological Control

Advisor: Bradley Mullens

B.S. Agricultural Biology: 1990, California State Polytechnic University, Pomona College of Agriculture ***Magna cum laude***

Focus: Integrated Pest Management/Plant Pathology

A.S. Microbiology: 1986, Chaffey College, Alta Loma, CA Division of Biological Sciences ***High Honors***

Focus: Lichen symbioses

TRAINING

Postdoctoral Researcher, Center for Biological Control, University of California, Berkeley. 4/1997-11/1997.
Chemical ecology of pine engraver (*Ips pini*) and its associated natural enemies

Research Assistant, UC, Riverside: 12/1992-3/1997. Ecology, evolution, and genetics of bark beetle/fungal interactions.

Research Assistant, UC, Riverside: Fall 1990 to Summer 1992. Biological control of houseflies using fungal pathogens.

Laboratory and Field Assistant (Medical and Veterinary Entomology/Extension Services), UC Riverside, Summer 1989, Summer 1990.

Microbiology Laboratory Assistant Directed production lab and aided in clinical/food quality testing, Chaffey College, 1983-1986.

Additional:

Sabbatical research conducted at the Forestry and Agricultural Biotechnology Institute at the University of Pretoria, South Africa, 2004-2005. Helped develop a multi-gene tree for *Leptographium/Ophiostoma* associated with *Dendroctonus* bark beetles and conducted field and lab work on *Ophiostoma* and invasive Scolytinae.

Field and lab research 2004-2015 Field studies on climate- and land use-driven declines of native African trees – South Africa, Namibia, Zimbabwe.

Participated in team that detected and reported the invasion of an exotic elm beetle, *Scolytus kirschii*, in Stellenbosch, South Africa 2004.

Visiting scientist: Forestry and Agricultural Biotechnology Institute at the University of Pretoria, South Africa, May-June 2006-2009, Participant in Tree Cooperative Protection Programme with commercial forestry companies and operations in Mpumalanga and Kwazulu-Natal in May 2006.

2006-2015: Collaborative research on *Euphorbia* die-back due to climate change, bark/ambrosia beetles, and fungi.

Visiting scientist: Climate change effects on ambrosia beetles and their fungi-National University of Science and Technology, Bulawayo, Zimbabwe, May 2010.

Senior member of NSF Research Coordination Network 2018-2023 'The Bark Beetle Mycobiome'

TEACHING RESPONSIBILITIES

University of Montana, Missoula:

Present:		credits
Forest Insects and Disease FORS 232	spring (odd)	2
Aquatic invertebrate Ecology WBIO 485	fall	3
Independent research-aquatic insect monitoring (all)		1-2
Systems Ecology Seminar Series BIOS 595	spring	1
Elements of Ecological Restoration NRSM 265	fall	1
Field Ecology BIOS	summer	5
Past courses:		
Forest Ecology Seminar 595	fall	1
Research Methods FOR 501	spring	3
Forest Entomology and Lab FOR 332	fall	3
Theory/Appl. of Biological Control FOR 495	occasional	3
Readings in Insect Ecology FOR 595/BIOL595	occasional	1
Careers in Natural Resources FOR 180	fall/spring	2
Disturbance Ecology 595	occasional	2
Faculty Roles: Alternate Paradigms FOR595	occasional	3
Insect-Fungus Interactions and Lab FOR 595	occasional	3
Seminar: Symbiosis FOR 595	spring (occasional)	2
Environmental Entomology and Lab FOR 335	fall (odd)	3
Ecological Restoration Capstone NRSM 444	fall (even)	3
Ecological Restoration Seminar NRSM 494	Spring (odd)	1

Grants: to present

Research: \$3,486,348.00 Various including NSF, USDA NRI, NIFA, USFS
Non-research: \$3,500,000.00 (NSF-ADVANCE-PACE)

PUBLICATIONS

Peer-reviewed:

Six, D. L. and B. A. Mullens. 1996. Seasonal prevalence of *Entomophthora muscae* and introduction of *Entomophthora schizophorae* (Zygomycotina: Entomophthorales) in *Musca domestica* (Diptera: Muscidae) populations on California dairies. *Biological Control* 6: 315-323.

- Six, D. L. and B. A. Mullens. 1996.** Distance of conidial discharge of *Entomophthora muscae* and *E. schizophorae* conidia. *Journal of Invertebrate Pathology* 67: 253-258.
- Six, D. L. and T. D. Paine. 1996.** *Leptographium pyrinum* is a mycangial fungus of *Dendroctonus adjunctus*. *Mycologia* 88: 739-744.
- Six, D. L. and T. D. Paine. 1996.** A technique for the introduction of fungi to bark beetle mycangia. *Journal of Entomological Science* 31: 466-468.
- Six, D. L. and T. D. Paine. 1997.** *Ophiostoma clavigerum* is the mycangial fungus of the Jeffrey pine beetle, *Dendroctonus jeffreyi* (Coleoptera: Scolytidae). *Mycologia* 89: 858-866.
- Six, D. L. and T. D. Paine. 1998.** The effects of mycangial fungi on development and emergence of *Dendroctonus ponderosae* and *D. jeffreyi*. *Environmental Entomology*. 27: 1393-1401.
- Six, D. L. and T. D. Paine. 1999.** Phylogenetic comparison of the ascomycetes associated with the mycangia of *Dendroctonus* bark beetles. *Annals of the Entomological Society of America* 92: 159-166.
- Six, D. L. and T. D. Paine. 1999.** Allozyme diversity and gene flow in the bark beetle, *Dendroctonus jeffreyi* (Coleoptera: Scolytidae). *Canadian Journal of Forest Research*. 29: 315-323.
- Six, D. L. and T. D. Paine. 1999.** Allozyme diversity and gene flow in *Ophiostoma clavigerum* (Ophiostomatales: Ophiostomataceae), the mycangial fungus of the Jeffrey pine beetle, *Dendroctonus jeffreyi* (Coleoptera: Scolytidae). *Canadian Journal of Forest Research* 29: 324-331.
- Six, D. L., P. Alaback, R. A. Winfree, D. Snyder, and A. Hagele. 2000.** Pros and cons of using wilderness areas for biological research. *Proceedings of the Wilderness Science in a Time of Change Conference*. Missoula, MT. May 23-27, 1999.
- Six, D.L., M. Vander Meer, T. H. DeLuca, and P. Kolb. 2002.** Pine engraver, *Ips pini* (Say), colonization of logging residues created using alternative slash management systems in western Montana. *Western Journal of Applied Forestry* 17: 96-100.
- Powell, H. D. W., S. Hejl, and D. L. Six. 2002.** Measuring woodpecker food: a simple method for comparing wood-boring beetle abundance among fire-killed trees. *J. Field Ornithol.* 73: 130-140.
- Six, D.L. 2003.** A comparison of mycangial and phoretic fungi of individual mountain pine beetles. *Canadian Journal of Forest Research*. 33: 1331-1334.
- Six, D.L. and B.J. Bentz. 2003.** The fungi associated with the North American Spruce Beetle, *Dendroctonus rufipennis*. *Canadian Journal of Forest Research*. 33: 1815-1820.
- Six, D.L., T.C. Harrington, J. Steimel, D. McNew, and T.D. Paine. 2003.** Genetic relationships among *Leptographium terebrantis* and the mycangial fungi of three western *Dendroctonus* bark beetles. *Mycologia* 95: 781-792.
- Dahlsten, D.L., D.L. Six, N. Erbilgen, K.F. Raffa, A.B. Lawson, and D.L. Rowney. 2003.** Attraction of *Ips pini* (Coleoptera: Scolytidae) and its predators to various enantiomeric ratios of ipsdienol and lanierone in California: implications for the augmentation and conservation of natural enemies. *Environmental Entomology* 32: 1115-1122.

- Six, D.L. and K. D. Klepzig. 2004.** *Dendroctonus* bark beetles as model systems for the study of symbiosis. *Symbiosis* 37: 207-232.
- Klepzig, K.D. and D.L. Six. 2004.** Bark beetle fungal symbioses: Context dependency in complex associations. *Symbiosis* 37: 189-206.
- Shelley, R.M. and D.L. Six. 2004.** Discovery of the centipede, *Scolopocryptops gracilis* Wood, in Montana (Scolopendromorpha: Scolopocryptopidae). *Western North American Naturalist* 64: 257-258.
- Dahlsten, D.L., D.L. Six, D.L. Rowney, A.B. Lawson, N. Erbilgin, and K.F. Raffa. 2004.** Attraction of *Ips pini* (Coleoptera: Scolytidae) and its predators to natural attractants and synthetic semiochemicals: Implications for population monitoring in Northern California. *Environmental Entomology*. 33: 1554-1561.
- Waring, K. M. and D.L. Six. 2005.** Distribution of bark beetle attacks following whitebark pine restoration treatments. *Western Journal of Applied Forestry*. 20: 110-116.
- Six, D.L. and M. Newcomb. 2005.** A rapid method for rating white pine blister rust incidence, severity, and distribution within individual trees in whitebark pine. *Northwest Science* 79: 189-195.
- Mueller, U., N. Gerardo, D. Aanen, D. L. Six, and T. Schultz. 2005.** The evolution of agriculture in insects. *Annual Review of Ecology, Evolution, and Systematics*. 36: 563-595.
- Six, D.L., Z.W. de Beer, R.A. Beaver, L. Visser, and M.J. Wingfield. 2005.** Exotic invasive elm beetle, *Scolytus kirschii*, detected in South Africa. *South African Journal of Science*. 101: 229-232.
- Jensen, J. and D. L. Six. 2006.** Myrmecochory of the exotic plant, *Centaurea maculosa* (spotted knapweed), in western Montana: a potential mechanism enhancing invasiveness. *Environmental Entomology* 35: 326-331.
- Bentz, B.J. and D.L. Six. 2006.** Ergosterol content of three fungal species associated with *Dendroctonus ponderosae* and *D. rufipennis* (Coleoptera: Curculionidae, Scolytinae). *Annals of the Entomological Society of America* 99: 189-194.
- Ortega, Y.K., K. S. McKelvey and D. L. Six. 2006.** Invasion of an exotic forb impacts reproductive success and site fidelity of a migratory songbird. *Oecologia* 149: 340-351.
- Adams, A.S. and D.L. Six. 2006.** Temporal variation in mycophagy and prevalence of fungi associated with developmental stages of the mountain pine beetle, *Dendroctonus ponderosae* (Coleoptera: Curculionidae, Scolytinae). *Environmental Entomology* 36: 64-72.
- Yen, T., D.L. Six, and E. Burke. 2006.** A rapid culture-independent direct molecular method for detection of *Phellinus pini* from wood of lodgepole pine (*Pinus contorta*). *Forest Products Journal* 56: 107-110.
- Six, D.L. and B.J. Bentz. 2007.** Temperature determines symbiont abundance in a multipartite bark beetle-fungus ectosymbiosis. *Microbial Ecology* 54: 112-118.
- Six, D.L. and J. C. Adams. 2007.** Relationships between white pine blister rust and the selection of individual whitebark pine by the mountain pine beetle. *Journal of Entomological Science* 42: 345-353.

- Lee, S., Breuil, C. Hamelin, R. and D.L. Six. 2007.** Genetic diversity and the presence of two distinct groups in *Ophiostoma clavigerum* associated with the mountain pine beetle, *Dendroctonus ponderosae* in British Columbia and the northern Rocky Mountains. *Phytopathology* 97: 1177-1185.
- Bleiker, K. and D.L. Six. 2007.** Dietary benefits of fungal associates to an eruptive herbivore: potential implications of multiple associates on host population dynamics. *Environmental Entomology* 36: 1384-1396.
- Boone, C.K., D.L. Six, Y. Zheng, and K. F. Raffa. 2008.** Parasitoids and dipteran predators exploit volatiles from microbial symbionts to locate bark beetles. *Environmental Entomology*. 37: 150-161.
- Adams, A.S. D.L. Six, S. Adams, and W. Holben. 2008.** *In vitro* interactions among yeasts, bacteria and the fungal symbionts of the mountain pine beetle, *Dendroctonus ponderosae*. *Microbial Ecology* 56: 460-466.
- Adams, A.S. and D.L. Six. 2008.** Detection of host habitat by parasitoids using cues associated with mycangial fungi of the mountain pine beetle, *Dendroctonus ponderosae*. *The Canadian Entomologist* 140: 124-127.
- Boone, C.K., D. L. Six, and K. F. Raffa. 2008.** The enemy of my enemy is still my enemy: competitors add to predator load of primary bark beetles. *Agricultural and Forest Entomology* 10: 411-421. * awarded best paper for 2008-2009 by The Royal Entomological Society-awarded by the Queen of England
- Bleiker, K. and D.L. Six. 2008.** Competition and coexistence in a multi-partner mutualism: Interactions between two fungal symbionts of the mountain pine beetle in beetle-attacked trees. *Microbial Ecology* 57: 191-202.
- Roux, J., Malan, R., Howitt, M., Six D. and Wingfield, M.J. 2008.** Discovery of new fungi associated with the decline and death of *Euphorbia ingens* in the Limpopo province of South Africa. *South African Journal of Botany* 74: 377–378.
- Bleiker, K. P. and D. L. Six. 2009.** Effects of water potential and solute on the growth and interactions of two fungal symbionts of the mountain pine beetle. *Mycological Research* 113: 3-15.
- Six, D.L., W. D. Stone, Z. W. de Beer and S. W. Woolfolk. 2009.** *Ambrosiella beaveri*, sp. nov., Associated with an Exotic Ambrosia Beetle, *Xylosandrus mutilatus* (Coleoptera: Curculionidae, Scolytinae), in Mississippi. *Antonie van Leeuwenhoek International Journal of General and Applied Microbiology* 96: 17-29.
- Six, D.L. and K. Skov. 2009.** Response of bark beetles and their natural enemies to fire and fire surrogate treatments in mixed-conifer forests in western Montana. *Forest Ecology and Management* 258: 761-772.
- Boone, C. K., D.L. Six, and K. Raffa. 2009.** Assemblage of Hymenoptera arriving at logs colonized by *Ips pini* (Coleoptera: Curculionidae: Scolytinae) and its microbial symbionts in western Montana. *Canadian Entomologist* 141: 172-199.
- Raffa, K.F., B. Aukema, B.J. Bentz, A. Carroll, N. Erbilgin, D.A. Herms, J. A. Hicke., R. W. Hofstetter, S. Katovich, B. S. Lindgren, J. Logan, W. Mattson, A. S. Munson, D. J. Robison, D. L. Six, P. C. Tobin, P. A. Townsend, and K. F. Wallin. 2009.** A literal use of “forest health” safeguards against misuse and misapplication. *Journal of Forestry* 107: 276-278.

- Bleiker, K.P. S.E. Potter, C.R. Lauzon and D.L. Six. 2009.** Transport of fungal symbionts by mountain pine beetles. *Canadian Entomology* 18: 55-59.
- Hansen, A., D.L. Six and Y. Ortega. 2009.** Comparison of ground beetle (Coleoptera: Carabidae) assemblages in Rocky Mountain savannas invaded and un-invaded by an exotic forb, spotted knapweed. *Northwest Science* 83: 348-360. ***This article was the featured article for BioOne in October 2009***
- Six, D.L. 2009.** Climate change and mutualism. *Nature Reviews Microbiology* 7: 686. ***Invited***
- Hatala, J.A., M.C. Dietze, R.L. Crabtree, K. Kendall, D.L. Six, and P.R. Moorcroft. 2011.** An ecosystem-scale model for the spread of a host-specific forest pathogen in the Greater Yellowstone Ecosystem. *Ecological Applications* 21:1138-1153
- Six, D.L. and M. J. Wingfield. 2011.** The role of phytopathogenicity in bark beetle-fungus symbioses: A challenge to the classic paradigm. *Annual Review of Entomology* 56: 255-272. ***Invited***
- Wingfield, M. J., M. P. A. Coetzee, P. W. Crous, D. L. Six and B. D. Wingfield. 2011.** Fungal phoenix rising from the ashes? *IMA Fungus* 1: 149-153.
- Massoumi-Alamouti, S., D. L. Six, V. Wang, S. Diguistini, J. Bohlman, R.C. Hamelin, N. Feau, and C. Breuil. 2011.** Gene genealogies reveal cryptic speciation and host-specificity for the pine fungal pathogen, *Grosmannia clavigera*. *Microbial Ecology* doi 10.1111/j:1365-294X.2011.05109.x
- Six, D.L, de Beer, ZW, Duong, T, Carroll, A. L. and M. J. Wingfield. 2011.** Fungal associates of the lodgepole pine beetle, *Dendroctonus murrayanae*. *Antonie van Leeuwenhoek* 100: 231-244.
- Six, D.L., M. Poulsen, A. K. Hansen, M. J. Wingfield, J. Roux, P. Eggleton, B. Slippers, and T. D. Paine. 2011.** Anthropogenic effects on insect-microbial symbioses in forest and savanna ecosystems. *Symbiosis* 53: 101-121. ***Cover article***
- van der Linde, J. A., D. L. Six, and J. Roux. 2011.** New species of *Gondwanamyces* from dying *Euphorbia* trees in South Africa. *Mycologia* 104:574-584.
- van der Linde, J.A, D. L Six, M. J. Wingfield, and J. Roux. 2011.** *Lasiodiplodia* species associated with dying *Euphorbia ingens* in South Africa. *Southern Forests* 73: 165-173.
- van der Linde, J.A., J. Roux, M.J. Wingfield, and D.L. Six. 2012.** Die off of giant *Euphorbia* trees in South Africa: Symptoms and relationships to climate. *South African Journal of Botany* 83: 172-185.
- Six, D.L. 2012.** Ecological and Evolutionary determinants of bark beetle-fungus symbioses. *Insects* 3: 339-366.
- Biedermann, P. H. W., K. D. Klepzig, Taborsky and D. L. Six. 2013.** Dynamics of filamentous fungi in the ambrosia gardens of the primitively eusocial beetle *Xyleborinus saxesenii* Ratzeburg (Scolytinae: Curculionidae). *FEMS Microbial Ecology* 83: 711-723.
- Addison, A, J.A. Powell, D.L. Six, M. Moore, and B. Bentz. 2013.** The role of temperature variability in stabilizing the mountain pine beetle-fungus mutualism. *Journal of Theoretical Biology* 335: 40-50.

Six, D. L. 2013. The bark beetle holobiont: Why microbes matter. *Journal of Chemical Ecology* 39: 989-1002. *Invited*

Six, D.L., E. Biber and E. Long. 2014. Management for mountain pine beetle outbreak suppression: Does relevant science support current policy? *Forests* 5: 103-133. *Invited*

Addison, A., J.A. Powell, D. L. Six and B. J. Bentz. 2015. Integrating models to investigate critical phenological overlaps in complex ecological interactions: the mountain pine beetle-fungus symbiosis. *Journal of Theoretical Biology* 68: 55-66.

Bracewell, R, and D. L. Six. 2015. Broadscale specificity in a beetle-fungal symbiosis: A spatio-temporal molecular analysis of the mycangial fungi of the western pine beetle. *Microbial Ecology* 68: 859-870.

Moore, M., J. Powell, B. Bentz, and D.L. Six. 2015. Effects of temperature on growth, sporulation, and competition of mountain pine beetle fungal symbionts. *Microbial Ecology* 70: 336-347.

Dooley, E., J.A. Powell and D.L. Six. 2015. A comparison of mountain pine beetle (Coleoptera: Curculionidae, Scolytinae) productivity and survival in lodgepole and whitebark pine after a region-wide cold weather event. *Forest Science* 61: 235-246.

Dysthe, J.C., R. Bracewell, and D.L. Six. 2015. Temperature effects on growth of the fungal symbionts of the western pine beetle. *Fungal Ecology* 17: 62-68.

Dooley, E, and D.L. Six. 2015. Severe white pine blister rust infection in whitebark pine alters mountain pine beetle (Coleoptera: Curculionidae) attack density, emergence rate, and body size. *Environmental Entomology* 44: 1384-1394

Bracewell, R. R. and D.L. Six. 2015. Experimental evidence of bark beetle adaptation to a fungal symbiont. *Ecology and Evolution* 5: 5109-5119.

Van der Linde, J. D.L. Six, W.Z. de Beer, M.J. Wingfield, and J. Roux. 2016. Novel ophiostomatalean fungi from galleries of *Cyrtogenius africanus* (Scolytinae) infesting dying *Euphorbia ingens*. *Antonie van Leeuwenhoek Journal of Microbiology* 109: 589-601.

Van der Linde, J., D.L. Six, J. Roux. 2017. Landscape degradation may contribute to large-scale die-off of *Euphorbia ingens* in South Africa. *South African Journal of Botany* 111: 144-152

Van der Linde, J. and D. L. Six, M. J. Wingfield and J. Roux. 2017. Seasonal flight patterns of Curculionidae (Cossoninae and Scolytinae) infesting dying *Euphorbia ingens* in South Africa. *Journal of Entomological Science* 70-81

Six, D.L., Vergobbi, C., and M. Cutter. 2018. Are survivors different? Genetic and growth analyses of co-occurring whitebark and lodgepole pine after a mountain pine beetle outbreak. *Frontiers in Plant Science* 9: 993.

Bracewell, R.R., Vanderpool, D., Good, J., and D.L. Six. 2018. Cascading speciation among mutualists and antagonists in a tree-beetle-fungal interaction. *Royal Society Proc B* 285: 20180694.

National Academies of Sciences, Engineering, and Medicine. 2019. *Forest Health and Biotechnology: Possibilities and Considerations*. Washington, DC: The National Academies Press.
<https://doi.org/10.17226/25221>. Peer-reviewed. I was one of 10 authors.

Six, D.L. and J. J. Elser. 2019. Extreme ecological stoichiometry of a bark beetle-fungus mutualism. *Ecological Entomology* 44:543-551

Biedermann, P., J.-C. Grégoire , A. Gruppe , J. Hagge , A. Hammerbacher , R. Hofstetter , D. Kandasamy , M. Kolarik , M. Kostovcik , P. Krokene , J. Müller, A. Sallé , D. L. Six , T. Turrini , D. Vanderpool , M. Wingfield , C. Bässler. 2019. Bark Beetle Population Dynamics in the Anthropocene: Challenges and Solutions. *TREE*
<https://doi.org/10.1016/j.tree.2019.06.002>

Six, D.L. 2019 A major symbiont shift supports a major niche shift for a clade of bark beetles. *Ecological Entomology* <https://doi.org/10.1111/een.12786>

Six, D.L. 2019. Applying niche construction theory to link colonization behavior and causal chain-effects in bark beetle-fungus symbioses, *Current Opinion in Insect Science*. **Invited review-only journal. In review.**

In prep:

Six, D.L. *Entomocorticum* and *Ceratocystiopsis* spp. nov. associated with mycangia of the western pine beetle, *Dendroctonus brevicomis* for *Persoonia* October 2019

Six, D.L. Why models of mutualism sometimes miss the boat: Moving beyond the agonist-mutualist continuum. For *TREE* April 2020

Six, D.L., Brown, P., Hicke, J.A., Bergstrom, E., and Perkins, D. Natural selection for trees better adapted to a new normal? Genetic, chemical, and growth differences between mountain pine beetle-selected trees and surviving whitebark pines. For *Frontiers in Plant Science* June 2020

Six, D.L. Assessing ponderosa pine resistance to mountain pine beetle at Devil's Tower National Monument and Wind Cave National Park using tree phenotype, genotype, and climate data.

Strid, Y., D.L. Six et al. Fire in *Pinus sylvestris* forests: Impact on fungal symbionts of *Tomicus piniperda* and on carbon, nitrogen and phosphorous availability in fungi-colonised phloem. For *Forests* December 2019.

Six, D.L. and Klepzig, K.D. Context dependency in bark beetle-fungus symbioses revisited. January 2020.

Book chapters:

Six, D.L. 2003. Bark Beetle-Fungus Symbioses. Pp. 99-116. In: *Insect Symbiosis*. Eds. K. Bourtzis and T. A Miller. CRC Press.

Six, D.L. 2005. Population genetics of bark beetles and their associated blue-stain fungi with the use or molecular markers. In: *Forest Pathology: From Genes to Landscapes*. J.E. Lundquist, R.C. Hamelin, and C. Aquirre-Bravo, eds. American Phytopathological Society Press.

Six, D.L. and R. Bracewell. 2015. *Dendroctonus*. In: Bark Beetles: Biology and Ecology of Native and Invasive Species. F. Vega and R. Hofstetter eds. Elsevier Press

Technical Reports:

Bentz, B., J. Logan, J. MacMahon, C. D. Allen, M. Ayres, E. Berg, A. Carroll, M. Hansen, J. Hicke, L. Joyce, W. Macfarlane, S. Munson, J. Negrón, T. Paine, J. Powell, K. Raffa, J. Régnière, M. Reid, B. Romme, S. J. Seybold, D. Six, D. Tomback, J. Vandygriff, T. Veblen, M. White, J. Witcosky, D. Wood. Bark Beetle Outbreaks in Western North America: Causes and Consequences. 2009. University of Utah Press. 44 pp.

Popular articles:

Six, D.L. 2010. Tiny Agents of Forest Change. The Montana Naturalist. Fall issue.

Six, D.L. 2013. The Great Mountain Pine Beetle Expansion. Spring issue, American Forests.
<http://www.americanforests.org/our-programs/endangered-western-forests/mountain-pine-beetles-expansion-in-the-west/>

Six, D.L. 2013. The mountain pine beetle in a changing climate: What does it mean for Montana's forests? Winter issue, Montana Business Quarterly

Videos:

An Evolutionary Marriage (<http://vimeo.com/47101945>)- collaborative effort with MSU Nature Filmmaking Program student Christina Choate that covers work on genomics of the Scolytinae-fungus symbiosis. Funded by NSF.

The Life of Pine <https://video.nationalgeographic.com/video/short-film-showcase/this-tiny-beetle-is-devastating-forests-in-the-worst-outbreak-ever>

Non-peer-reviewed publications: not included

PRESENTATIONS

INVITED seminars and presentations

Six, D. L. and T. D. Paine. 1994. The mountain pine beetle, Jeffrey pine beetle, and their mycangial fungi. California Forest Pest Council, Disease and Insect Committee Joint Field Meeting, Mammoth Lakes, CA. September 22.

Six, D. L. and T. D. Paine. 1995. Bark beetles and mycangial fungi: Mutualism or exploitation? "Insect symbiosis: who's using whom?" (Symposium), ESA Pacific Branch meetings, San Diego, CA. June 18-22.

Six, D. L. and T. D. Paine. 1995. Associations among bark beetles and symbiotic fungi. Southern California Pest Committee. Riverside, CA. October 26.

- Six, D. L.** and T. D. Paine. 1996. Fitness effects of symbiotic fungi on bark beetles. North American Forest Insect Work Conference. San Antonio Texas. April 8-12.
- Six, D. L.** and T. D. Paine. 1996. Evolution and ecology of bark beetle/mycangial fungus associations. U.C., Riverside. Department of Entomology, Departmental Seminar. June 3.
- Six, D. L.** and T. D. Paine. 1997. Ecological and evolutionary aspects of bark beetle/mycangial fungus associations. Entomological Society of America Pacific Branch Meetings. Comstock Symposium. June 2. San Jose, CA.
- Six, D. L.** 1998. Genetic and geographic variation in forest insects. Western Forest Insect Work Conference, Jackson Hole, Wyoming. March 2-5.
- Six, D. L.** 1998. Using mycangial fungi as indicators of bark beetle population isolation. Western Forest Insect Work Conference, Jackson, WY. March 2-5.
- Six, D. L.** 1998. Sorting out the roles of symbiotic fungi in bark beetle ecology. Forest Sciences departmental seminar. Utah State University, Logan, UT. May 1.
- Six, D. L.** 1998. Management of bark beetles in western forests. Society of American Foresters, University of Montana, Missoula, MT. October 1.
- Six, D. L.** 1998. Why are bark beetles always associated with fungi? Entomology Departmental Seminar. Montana State University, Bozeman, MT, October 7.
- Six, D. L.** 1999. Evolution and roles of bark beetle symbiotic fungi. Ecology Seminar Series, Organismal Biology and Ecology Program and Wildlife Biology, University of Montana. February 7.
- Six, D. L.** 1999. Insects and Diseases that Affect Ponderosa Pine, 9th Annual MSU Extension Forestry Mini-College – October 16, 1999. UM, Missoula, MT.
- Six, D. L.** 2000. Issues and Opportunities in Bark Beetle Management in the 21st Century. Forest Management Bureau Spring Training, June 5-7, 2000, Hampton Inn, Kalispell, MT
- Six, D. L.** 2000. Fire/Insect Interactions. Wildland Fires 2000 Seminar Series, University of Montana, Missoula, MT, 18 October 2000.
- Six, D.L.** 2001. Bark beetles, fungi, and beer. OBE/DBS seminar, University of Montana, May 7.
- Six, D. L.** 2001. Fire and bark beetles. North American Forest Insect Work Conference. Edmonton, Canada. 15-18 May 2001. Panelist.
- Six, D.L.** 2002. Interactions among mountain pine beetle, white pine blister rust and fire in whitebark pine. March 17. USDA FS RMRS Fire Sciences Lab Seminar Series. Missoula, MT.
- Six, D.L.** 2002. The National Fire and Fire Surrogate Study: Lubrecht Forest. Western Forest Insect Work Conference, Whitefish, MT. April 22-26, 2002.

- Six, D.L.** 2002. Factors contributing to susceptibility of whitebark pine to attack by mountain pine beetle. Western Forest Insect Work Conference, Whitefish, MT. April 22-26, 2002.
- Six, D.L.** 2002. Future directions for research on bark beetle-fungal associations. Symposium: Bark beetle-mite-fungus-tree interactions. Western Forest Insect Work Conference, Whitefish, MT. April 22-26, 2002.
- Six, D.L.** 2002. The consequences of oligophily in bark beetle-fungus associations. Symposium: Bark beetle-mite fungus associations. International Congress of Mycology, Oslo, Norway. August 11-16, 2002.
- Six, D. L.** 2002. New perspectives on bark beetle-fungus associations. Symposium: Insect Symbiosis. European Congress of Entomology. Thessaloniki, Greece. October 7-13, 2002.
- Six, D.L.** 2003. Panelist in panel discussion: The role of fire and silviculture in promoting forest health. Western States Land Commissioners Association 2003 summer conference. Big Sky, MT. July 13-17.
- Six, D.L.** and A. S. Adams. 2004. Shifting symbionts. Combined meetings of the Western Forest Insect Work Conference and the Western Forest Disease Work Conference. San Diego, CA, April 26-30, 2004.
- Bentz, B.J.** and D.L. Six. Can fungi provide a dietary source of sterols for *Dendroctonus* bark beetles? Combined meetings of the Western Forest Insect Work Conference and the Western Forest Disease Work Conference. San Diego, CA, April 26-30, 2004.
- Six, D.L.** 2004. The fungi associated with the Jeffrey Pine Beetle. Field trip presentation. Combined meetings of the Western Forest Insect Work Conference and the Western Forest Disease Work Conference. San Diego, CA, April 26-30, 2004.
- Six, D.L.** 2004. The National Fire/Fire Surrogate Study: Results from Montana. Combined meetings of the Western Forest Insect Work Conference and the Western Forest Disease Work Conference. San Diego, CA, April 26-30, 2004.
- Six, D.L.** 2004. Bark beetle-fungus symbioses: defining roles and determining evolutionary histories. Combined meetings of the Western Forest Insect Work Conference and the Western Forest Disease Work Conference. San Diego, CA, April 26-30, 2004.
- Six, D.L.** 2004. Bark beetle-fungus symbioses: looking beyond two species interactions. Departmental Seminar. September. School of Forestry, Northern Arizona University, Flagstaff, AZ
- Six, D.L.** 2004. Bark beetle-fungus-symbioses: teasing apart interaction types. Combined Special Seminar for the Forestry and Agricultural Biotechnology Institute, University of Pretoria, Pretoria, South Africa, and Society of South African Plant Pathologists Northern Branch Special Event: November 26th.
- Six, D.L.** 2005.-- *Invited Keynote address*—
How important is pathogenicity in bark beetle-fungus symbioses?
Combined annual meetings of the Society of South African Plant Pathologists and the African Mycological Society. January 22-26, Hartenbos, South Africa.
- Six, D.L.** 2005. Temporal variation in bark beetle fungal associates. Special Seminar, Forestry and Agricultural Biotechnology Institute, University of Pretoria, Pretoria, South Africa. March 17.

Six, D.L., Z.W. de Beer, and M.J. Wingfield. 2005. ---*Invited key symposium paper*--- Evolution of bark beetle-fungus symbioses. The joint meeting of the three divisions of the International Union of Microbial Societies, IX International Congress of Mycology. July 23-28 San Francisco, CA.

Six, D.L. 2005. Presentation to the President's Advisory Council- UM Research in Forest Entomology and Pathology in the CFC. University of Montana, Sept 16th.

Six, D.L. 2005. Research in the College of Forestry and Conservation on insects and invasives. CFC Advisory Board, UM, Sept. 30.

Six, D.L., B.J. Bentz, A.S. Adams, and K. Bleiker. 2005. Potential for climate change to alter mountain pine beetle population dynamics through effects on fungal symbionts. Bark Beetle Summit. Nov. 13-18, Snowbird Resort, UT.

Six, D.L., B.J. Bentz, A.S. Adams, and K. Bleiker. 2005. Effects of environment on mycophagy and vectoring of fungal associates of the mountain pine beetle. Forest Entomology Symposium. Entomological Society of America Annual Meeting, Dec. 13-18, Ft. Lauderdale, FL.

Six, D.L. 2006. Bark beetle-fungus symbioses: How to get along without really trying. PACE Women in Science Lunch, UM, 24 April.

Six, D.L. 2006. Bark beetles and their fungal associates. Tree Protective Cooperative Programme annual meeting. May 9. University of Pretoria, Pretoria, South Africa.

Six, D.L. 2006. Symbiont shifting in bark beetle-fungus symbioses: A mechanism of stability? Special seminar, Biological Sciences, University of Alberta, Edmonton, Canada. 29 June.

Six, D.L. 2006. Ecological and Evolutionary Determinants of Bark beetle-Fungus Symbioses. Workshop (invitation only): Ophiostomatoid Fungi: Expanding Frontiers. 16-19 August, North Stradbroke Island, Queensland, Australia.

Six, D.L., A. S. Adams and B.J. Bentz. 2006. Temperature driven symbiont shifting in a bark beetle-fungus ectosymbiosis. 21 August. 7th International Congress of Mycology, Cairns, Australia.

Six, D.L. 2006. Bark beetle dynamics in western forests. To: USDA Forest Service Wildlife Council, FS Region 1 office, 26 Sept.

Six, D.L. 2007. Effects of climate change on insect-microbial symbioses. International Sirex Congress, University of Pretoria, Pretoria, South Africa. May 9-16.

Six, D.L. 2007. Ecological and Evolutionary determinants of bark beetle-fungus symbioses. Departmental seminar – Biological Sciences, University of Calgary, Alberta, Canada. October 24, Calgary.

Six, D.L. 2007 - *Keynote speech* – The mountain pine beetle in a changing world. 55th Annual Meeting of the Entomological Society of Alberta. October 25-27, Olds, Alberta, Canada

- Six, D.L.** 2007. A rapid rating system for white pine blister rust in whitebark pine. Whitebark Pine Ecosystem Foundation Annual Meeting Sept. 28-30. Lincoln, MT
- Six, D.L.**, R. Hofstetter, and K. Klepzig. 2008. Geographic variation in the fungal symbiont community associated with the southern pine beetle, *Dendroctonus frontalis*. Western Forest Insect Work Conference, Boulder, CO April 7-10.
- Six, D.L.** 2008. The use of molecular techniques to inform our understanding of insect-fungal interactions. Western Forest Insect Work Conference, Boulder, CO April 7-10.
- Six, D.L.** 2008. **Lead presentation.** Bark Beetles: What they do and why they do it. Governor Schweitzer's Red Tree Symposium. The University of Montana, Missoula. June 5.
- Six, D.L.** and M.J. Wingfield. 2008. The role of phytopathogenicity in bark beetle-fungus symbioses. July 2, IUFRO Pretoria, South Africa.
- Gillette, N.** other authors...**D.L. Six.** 2008. *Dendroctonus valens* in China: A beetle and its associated fungi exhibit radically different effects on host trees in a new environment. July 8, International Congress of Entomology, Durban, South Africa.
- Lee S, **D. L. Six**, R. Hamelin, and Collette Brueil. 2008. The expansion of the geographic range of the mountain pine beetle and one symbiont genotype in Canada in response to increasing temperatures. July 8, International Congress of Entomology, Durban, South Africa.
- Six, D.L.** and B. J. Bentz. 2008. The effect of temperature and climate change on the distribution of bark beetle-associated fungi. July 8, International Congress of Entomology, Durban, South Africa.
- Six, D.L.** and B. Slippers. 2008. Multi-scale effects of humans on forest insect-microbe symbioses. International Congress of Entomology, July 8, Durban, South Africa.
- Ott, E.** and **D.L. Six.** 2008. Ambrosia beetle interactions with fungi. July, International Congress of Entomology, Durban, South Africa.
- Six, D.L.** 2009. The role of phytopathogenicity in bark beetle-fungus symbioses: A challenge to the classic paradigm, *Distinguished Speaker's Seminar*, Department of Entomology, UC Davis, CA. Jan. 21
- Six, D.L.** 2009. Bark beetle-fungus symbioses: Why do bark beetles partner with fungi? Sigma Xi lecture. University of Montana, MT. Feb 26
- Six, D.L.** 2009. Bark beetles in the west. Montana Discovery Foundation. Helena, MT. March 12.
- Six, D.L.** 2009. Mutualism as a driver of landscape process. The College of Forestry and Conservation Forestry Seminar. University of Montana, MT. April 17.
- Six, D.L.** 2009. How the environment can influence the biology of forest insect pests. Tree Protection Cooperative Programme annual meeting. University of Pretoria, Pretoria, South Africa. 13 May.

Six, D.L. 2009. Interactions of climate, host tree defenses, white pine blister rust, and the mountain pine beetle. North American Forest Ecology Workshop, Logan, UT. June 22.

Six, D.L., B. J. Bentz, and J. Powell. 2009. Climate change and the stability of bark beetle-fungal symbioses. International Congress of Symbiosis. University of Wisconsin, Madison, WI. August 11.

Six, D.L. 2010. Climate change and bark beetles. Society of American Foresters State Meeting, Missoula, MT. April 22.

Six, D.L. 2010. Mountain pine beetle and whitebark pine in the GYE, Special Seminar. USGS Headquarters, Renton, VA. Jan 4

Six, D. L. 2010. Climate change and insects. Seminar. National University of Science and Technology, Bulawayo, Zimbabwe. May 29.

Six, D.L. and T. Dahl. 2010. Why is whitebark pine preferred over lodgepole pine? Resin flow and sapwood moisture comparisons among two hosts. High Five Symposium, Missoula, MT. June 29.

Six D.L. and M. J. Wingfield. 2010. The role of phytopathogenicity in bark beetle-fungus symbiosis: A challenge to the classic paradigm. IUFRO International Congress of Forestry. Seoul, Korea. Aug 24

Six, D.L. 2010. Pathogen-insect mutualisms; How prevalent are they? IUFRO International Congress of Forestry. Seoul, Korea Aug 25

Six, D.L. 2010. Mountain pine beetle at Lubrecht Experimental Forest: 10 years of data from the fire and fire surrogate study plots. CFC Forest Ecology Seminar. Dec 4.

Six, D.L., B. J. Bentz, and J. Powell. 2010. Climate change effects on the mountain pine beetle-fungus symbiosis. Entomological Society of America, San Diego, CA. Dec.13.

Six, D.L. 2011. The mountain pine beetle: From the microbial to the landscape level. Montana Natural History Center, Missoula, MT. Jan 12.

Six, D.L. 2011. Bark beetle –fungus symbioses: Past, current and future dynamics. **‘Prestigious Speaker’** seminar. Combined University of Idaho, Moscow/University of Washington, Pullman Seminar. Sept. 28.

Six, D.L. 2011. Forests and Insects: From Montana Whitebark Pine to South African Euphorbia trees. Forests At Risk Symposium. Talk and **Panelist along with top climate scientists studying forests and Al Gore.** Aspen Institute, Aspen, CO. Feb 18.

Six, D.L. and M. J. Wingfield. 2011. The role of phytopathogenicity in bark beetle associated fungi. Tree Protection Cooperative Program Annual stakeholders meeting. The University of Pretoria, Pretoria, South Africa. May 11.

Six, D.L. 2011. Global Tree die-offs. Seminar. Forest and Agricultural Biotechnology Institute, Pretoria, South Africa. May 16.

Six D.L., J.A. Powell, M. Friedman, and B.J. Bentz. 2011. Climate change and the stability of bark beetle-microbe symbioses. Nov. 13-16, San Diego CA.

Six, D.L. 2011. A changing climate and changing forests. 34th Public Land Law Conference. The University of Montana, Missoula, MT. Sept 16.

Six, D.L. 2011. Mountain pine beetle-from microbes to landscapes. Senior Forum, Larchmont Golf Course, Missoula, MT Dec. 28

Six, D.L. 2012. Lessons from symbiotic theory for navigating, surviving, and succeeding in an academic career in entomology. **Symposium lead on “Challenges for Women in Entomology”**. International Congress of Entomology. Daegu, Korea. Aug. 19-21.

Six, D.L. 2012. Bark beetles and fungi: Effects of climate change on symbiont community and stability. **Symposium lead on “Symbiosis in Insects”** International Congress of Entomology, Daegu, Korea. Aug. 19-25.

Six, D.L. 2012. Mountain pine beetle: What makes it tick? Missoula City Club, Holiday Inn, Missoula, MT. Sept. 9.

Six, D.L. 2012. Effects of climate change on stability and community structure of bark beetle-fungus mutualisms. Special seminar. Swedish University of Agricultural Sciences, Uppsala, Sweden, October.

Six, D.L. 2012. Temperature as a mechanism of stability in the mountain pine beetle-fungus mutualism. **“Student’s Choice” Seminar**, School of Forestry, Northern Arizona University. October.

Six, D.L. 2013. The bark beetle-fungus contrapaso: When it takes three to tango, who leads? **Plenary talk**. Western Forest Insect Work Conference, Coeur d’ Alene, ID. March.

Six, D.L., McCutcheon, J., Vanderpool, D. and Bracewell, R. 2013. Genomics of beetle-fungus symbioses: From genes to ecosystems. Helen, MT. Montana EPSCoR/ Institute on Ecosystems Summit. August 22-23.

Six, D.L. 2013. **TEDx**. The Great Mountain Pine Beetle Bark Beetle Outbreak: A Global Perspective. Sept 19, 2013. One of 9 talks selected out of 136 applicants.

Six, D.L. 2013. Game changer: How climate change is altering interactions between beetles, trees and fungal symbionts. **Student’s Choice Seminar**, Dept. of Entomology, University of Arkansas, Fayetteville, AK. October 4.

Six, D.L. 2013. Game changer: How climate alters interactions among bark beetles, host trees, and symbionts. **Keynote talk**. XII Simposio Nacional de Parasitologia Forestal. 23-26 October. Durango. Mexico.

Six, D.L. 2013. Flipping a paradigm on its head: Why bark beetles really carry fungi. Invited symposium talk. Entomological Society of America annual meeting, November, Austin, Texas.

Six, D.L. 2013. From ecology to evolution to climate change: 20 years investigating a symbiosis. Invited symposium talk. Entomological Society of America annual meeting, November, Austin, Texas.

Six, D.L. 2014. A tale of two fungi: How a partnership built an empire (and may lead to its demise). Montana Institute on Ecosystems Rough Cut Seminar Series. Presented twice. Once at University of Montana (March 17) and once at Montana State University (March 19).

- Six, D.L.** 2015. Temperature as a driver of insect-microbial symbioses: Lessons from Bark beetles and fungi. Entomological Society of America Pacific Branch Meeting. April 12-15, Coeur d' Alene, ID.
- Bracewell, R.,** Good, J. and D.L. Six. 2015. Using population genomics to explore evolution in bark beetle-fungus symbioses. Entomological Society of America Pacific Branch Meeting. April 12-15, Coeur d' Alene, ID.
- Six, D.L.** 2015. Bark beetles in the west: Challenges and opportunities. Pacific Northwest Economic Summit field tour, University of Montana, Missoula
- Six, D L.** 2015. Keynote. Why global change matters to bark and wood boring insects. IUFRO Division 7.03.05 meeting, Bariloche, Argentina. October
- Six, D.L.** 2016. Effects of mountain pine beetle on lodgepole pine forest cover and recovery. Timber Measurements Society, Coeur d' Alene, ID, April 9.
- Six, D.L.,** C. Vergobbi, and P. Buotte. 2016. Adaptation to climate change: Embracing natural selection and genetics in whitebark pine conservation. Whitebark Pine Ecosystem Foundation Annual Conference, Whitefish, MT. Sept 16.
- Six, D. L.** 2017. From microbes to landscapes – how small things run the world. Flathead Biological Field Station Seminar. Bigfork, MT. Jan 19.
- Six, D.L.** 2017. Altered states of symbiosis: Bark beetles and fungi buck the dominant paradigm. Applied Mathematics Seminar, University of Montana, Feb 16.
- Six, D.L.** 2017. Are the trees telling us something? Using genetics, tree ring analysis, chemistry and resistance to insects in tandem to detect adaptation to climate. Tree Protection Cooperative Programme, FABI, University of Pretoria, South Africa, May 15.
- Six, D.L.,** Vergobbi, C., and Buotte, P. 2017. Ecological Society of America Annual Meeting, Portland, OR, Aug
- Six, D.L.,** C. Vergobbi, P. Buotte, D. Perkins. 2017. Using genetics, chemistry, and tree rings in tandem to detect adaptation to climate change and resistance to bark beetles. IUFRO Section 7 meeting. Thessaloniki, Greece. Sept. 11-14.
- Six, D.L.** 2017. Distinguished scientist seminar – A symbiont shift supported a niche shift in one clade of bark beetles. University of Illinois, Department of Entomology. Nov. 13.
- Six, D.L. 2017. FCFC Forestry Seminar - Hiding in plain view? High elevation pines surviving a climate-driven bark beetle outbreak are genetically and phenotypically different
- Six, D.L.** 2018. Adaptation and symbiosis – Using nature's toolkit to excel in science (and everything else). FABI 20 year anniversary celebration – University of Pretoria, Pretoria, South Africa, 24 January.
- Six, D.L.** 2018. Hiding in plain view? High elevation pines surviving a climate-driven bark beetle outbreak are genetically and phenotypically different. Systems Ecology Seminar Series, University of Montana. Mar1.

Six D.L. 2018. The ecological stoichiometry of mutualism and antagonism in a bark beetle-fungi symbiosis. Entomology Department Seminar, University of California, Riverside.

Six, D.L. and J. A. Hicke. 2018. Genetic-based selection of trees by mountain pine beetle during a climate change-driven outbreak in a high-elevation pine forest. Northwest Climate Conference, Coeur d' Alene, ID.

Six, D.L. 2019. The ecological stoichiometry of mutualism and antagonism in a bark beetle-fungi symbiosis. Warnell College of Forestry Graduate Seminar, University of Georgia, GA, May.

Six, D.L. 2019. Are the trees telling us something? Using genetics, tree chemistry, and tree ring analysis to detect climate adaptation and resistance to insects. Warnell College of Forestry College-wide seminar, University of Georgia, GA, May

Six, D.L. 2019. What you need to know about bark beetles. April, Lakeside Library Group, Lakeside, MT

Six, D.L. 2019. Considering genetics and adaptation in managing forests for the future. Healthy Forests-Healthy Watersheds- Climate Change Impacts and Issues on Tribal Lands - symposium. Nov 12-15. Tree Ring Laboratory, Tucson, Arizona.

Other presentations:

Six, D. L. and B. A. Mullens. 1991. Seasonal *Entomophthora muscae* activity on southern California dairies. 32nd Annual Entomology Conference, March 27-28. University of California, Riverside.

Six, D. L. and **B. A. Mullens**. 1992. Seasonal prevalence and attempted introduction of members of the *Entomophthora muscae* complex on southern California dairies. 33th Annual Entomology Conference, March 24-26, University of California, Riverside.

Six, D. L. 1992. Attempted introduction of a new form in the *Entomophthora muscae* complex into house fly populations in California. Society for Invertebrate Pathology, 25th Annual Meeting, August 16-21. Heidelberg, Germany.

Mullens, B. A., D. L. Six and R. K. Velten. 1993. *Bacillus thuringiensis* against lesser mealworm, *Alphitobius diaperinus* (Panzer). 34th Annual Entomology Conference, March 31-April 1. University of California, Riverside.

Six, D. L. and T. D. Paine. 1994. Apparent divergence of the mycangial fungi of two sibling species of *Dendroctonus*. Evolutionary Perspectives on Bark Beetle Biology and Management Workshop, September 8-11. Kananaskis Field Station, University of Calgary, Alberta, Canada.

Six, D. L. and T. D. Paine. 1994. Divergence of the mycangial fungi of *Dendroctonus jeffreyi* and *D. ponderosae*. 1st Annual Student Seminar Day, September 23, Department of Entomology, UC, Riverside.

Six, D. L. and T. D. Paine. 1994. Genetic, morphological, and temperature tolerance differences between the mycangial fungi of two sibling species of *Dendroctonus*. USDA W-187 meeting, Park City, Utah.

Six, D. L. and **T. D. Paine**. 1995. Evolutionary associations between bark beetles, mycangial fungi and host conifers. IUFRO S2.05-08 Bark Beetles, Blue-stain Fungi, and Conifer Defence Systems Symposium, 31 July-2 August, Ås, Norway.

Six, D. L. and T. D. Paine. 1995. *Leptographium pyrinum* is a mycangial fungus of *Dendroctonus adjunctus*. Mycological Society of America Annual Meeting, 6-12 August, San Diego, CA.

Six, D. L. and T. D. Paine. 1995. Genetic variation among populations of the Jeffrey pine beetle, *Dendroctonus jeffreyi*. 2nd Annual Student Seminar Day. Riverside, CA. September 26.

Six, D. L. and T. D. Paine. 1995. Genetic variation among populations of the Jeffrey pine beetle. USDA W-187 meeting, Estes Park, CO. November 4-5.

Luft, Patrick, D. L. Six, and T. D. Paine. 1995. Research in progress on Eugenia psyllid, Jeffrey pine beetle, and Cuban laurel thrips. California Forest Pest Council, Sacramento. Nov. 16-17.

Six, D. L. and T. D. Paine. 1996. Bark beetle associated fungi: assassins, hitchhikers or dinner? 37th Annual Entomology Conference, March 27. University of California, Riverside.

Six, D. L. and T. D. Paine. 1996. Possible consequences of small or fluctuating population size in the Jeffrey pine beetle, *Dendroctonus jeffreyi*. 3rd Annual UCR Student Seminar Day. September, 20.

Six, D. L. and T. D. Paine. 1997. Allozyme diversity, genetic identity, and gene flow in the bark beetle, *Dendroctonus jeffreyi*, and its mycangial fungus, *Ophiostoma clavigerum*, and a comparison of their phylogenies for evidence of cospeciation patterns at the microevolutionary level. Western Forest Insect Work Conference. Prince George, British Columbia, Canada. April.

Six, D. L. and D. L. Dahlsten. 1997. Preliminary results on investigations into methods for the conservation of natural enemies during pheromonally-based trap out programs for *Ips pini*. W-187 Regional Project meeting. Monterey, CA. November 2-6.

Six, D. L. and T. D. Paine. 1997. A comparison of the phylogenies of ascomycete mycangial fungi and *Dendroctonus* bark beetles. Entomological Society of America National Meetings. Nashville, TN. December 14-18.

Six, D. L. 1998. Evidence of inbreeding in the Jeffrey pine beetle, *Dendroctonus jeffreyi*. 2nd Bark Beetle Genetics Conference, Madison, WI. July 17-18.

Six, D. L., Dahlsten, D. L., Raffa, K., and B. Aukema. 1998. Application of chemical ecology to conservation and augmentation of bark beetle predators. 2nd Bark Beetle Genetics Conference, Madison, WI. July 17-18.

Six, D. L. 1999. Biological control of spotted knapweed and toadflax on Mt. Sentinel. Mt. Sentinel Public Forum, University of Montana, Missoula. April 8.

Six, D. L. 1999. Wilderness for Science: Pros and cons conducting research in wilderness. The Wilderness Conference, Missoula, MT. May 23-29.

Adams, J. and D.L. Six. 2001. Effects of white pine blister rust infection on mountain pine beetle preference in whitebark pine. Project TRAIN Poster Presentation Session. University of Montana, Missoula. Sept. 14

Six, D.L. 2001. Geographic and seasonal variation in fungi associated with the mountain pine beetle. W-187 Regional Research Project on Bark Beetle/ Pathogen/Conifer interactions. Forest Grove, OR, October 12-13, 2001.

Six, D.L. 2001. Geographic and seasonal variation in the mycangial fungi associated with *Dendroctonus ponderosae*. Entomological Society of America annual meeting, San Diego, CA. Dec. 9-13.

Six, D. L. Interpopulational variation in bark beetle fungal associates and its possible relationship to outbreak behavior. W-187 Regional Research Project on Bark Beetle/ Pathogen/Conifer interactions. Reno, NV, October 12-15, 2000.

Dahlsten, D.L., D.L. Six, D. Rowney, K. Raffa, W. Copper and A. Lawson. Application of chemical ecology to conservation and augmentation of bark beetle predators. Blodgett Forest Research Symposium, Blodgett Experimental Forest, Georgetown, CA June 18, 2001.

Baker, K. M. and D. L. Six. 2001. Restoring whitebark pine (*Pinus albicaulis*) ecosystems: A look at endemic bark beetle distribution. Society of American Foresters Annual Mtg.

Adams, J. and D.L. Six. 2001. Effects of white pine blister rust infection on mountain pine beetle preference in whitebark pine. Project TRAIN Poster Presentation Session. University of Montana, Missoula. Sept. 14

Six, D.L. 2001. Geographic and seasonal variation in fungi associated with the mountain pine beetle. W-187 Regional Research Project on Bark Beetle/ Pathogen/Conifer interactions. Forest Grove, OR, October 12-13, 2001.

Six, D.L. 2001. Geographic and seasonal variation in the mycangial fungi associated with *Dendroctonus ponderosae*. Entomological Society of America annual meeting, San Diego, CA. Dec. 9-13.

Adams, A.S., C. Boone, D.L. Six, K. Raffa, and D. Dahlsten. Role of fungi in host location by bark beetle parasitoids – ecological considerations. Annual Meeting of the Entomological Society of America. Ft. Lauderdale, FL Nov. 2002

Bleiker, K. and D.L. Six. Competitive interactions between fungal associates and mountain pine beetle. Annual Meeting of the Entomological Society of America. Ft. Lauderdale, FL Nov. 2002

Skov, K. and D.L. Six. Thinning and fire effects on three trophic levels in a ponderosa pine forest in western Montana. Annual Meeting of the Entomological Society of America. Ft. Lauderdale, FL Nov. 2002

Skov, K. and D. L. Six. Thinning and burning effects on bark beetles in western Montana: first season after treatments. SAF MT state meeting, 2002.

Newcomb, M. and D. L. Six. White pine blister rust in whitebark pine of the Greater Yellowstone Area: the role of *Ribes* species. Central Rockies Coordinating Committee. Ft. Collins. April 30, 2002.

Bleiker, K. and D.L. Six. Interactions between the mountain pine beetle and its associated fungi: W-187 Regional Research Project-Interactions among bark beetles, fungi, and conifers. Placerville, CA. Oct. 3-4, 2003.

Hansen, A. and D. L. Six. Effects of spotted knapweed invasion on the diversity and abundance of ground beetles (Coleoptera: Carabidae). UM Conference on Undergraduate Research. University of Montana, Missoula, MT April 4, 2003.

Adams, J.C. and D.L. Six. Effect of white pine blister rust, *Cronartium ribicola*, on the selection of individual whitebark pine, *Pinus albicaulis*, by the mountain pine beetle, *Dendroctonus ponderosae*. NSF TRAIN Poster Session, University of Montana, Missoula. Sept 26, 2003.

Six, D.L., T. C. Harrington, D. McNew, J. Steimel and T.D. Paine. Genetic relationships among *Leptographium terebrantis* and the mycangial fungi of three western bark beetles. IUFRO D7- Bark Beetle Biology and Management: From the 1960s to the 21st Century. Blodgett Experimental Forest, Georgetown, CA. 29 Sept. – 2 October, 2003.

Six, D.L. Bark beetle-fungus symbioses/Bark beetle interactions with biotic and abiotic factors: report for Montana for 2003. W-187 Regional Research Project-Interactions among bark beetles, fungi, and conifers. Placerville, CA. Oct. 3-4, 2003.

Adams, A. S. and D.L. Six. 2003. The mountain pine beetle, its fungi, and their relationships with parasitoids. W-187 Regional Research Project-Interactions among bark beetles, fungi, and conifers. Placerville, CA. Oct. 3-4, 2003.

Newcomb, M. and D.L. Six. White pine blister rust, whitebark pine and *Ribes* in the Greater Yellowstone Area. Yellowstone National Park. Greater Yellowstone Coordinating Committee. June 10, 2003.

Hansen, A. and D.L. Six. 2004. Effects of spotted knapweed invasion on ground beetle (Carabidae) assemblages in Rocky Mountain savannas. Combined meetings of the Western Forest Insect Work Conference and the Western Forest Disease Work Conference. San Diego, CA, April 26-30, 2004.

Skov, K. and D.L. Six. 2004. Douglas-fir beetle reproduction in burned and unburned trees in the first year after fire. Combined meetings of the Western Forest Insect Work Conference and the Western Forest Disease Work Conference. San Diego, CA, April 26-30, 2004.

Hansen, A. and D.L. Six. 2004. Effects of spotted knapweed invasion on ground beetle (Carabidae) diversity and abundance in Rocky Mountain savannas. Entomological Society of America Pacific Branch meeting, Bozeman, MT June 20-23, 2004.

Adams, A. and D. L. Six. 2004. Symbiotic fungi associated with developmental stages of the mountain pine beetle, *Dendroctonus ponderosae*. Entomological Society of America Pacific Branch meeting, Bozeman, MT June 20-23, 2004.

Bleiker K.P., and D.L. Six. 2004. Effects of two fungal associates of *Dendroctonus ponderosae* on beetle fitness. Annual Meeting of the Entomological Society of America, Salt Lake City, Utah, USA. November.

Adams, A. and D.L. Six. 2005. Association of *Dendroctonus ponderosae* larvae with fungi. 52nd National Annual Meeting of the Entomological Society of America, Salt Lake City. November.

- Hansen, A.** and D.L. Six. 2004. Honorable mention (second place) in graduate student paper competition for the President's Prize at the 52nd National Annual Meeting of the Entomological Society of America, Salt Lake City. Effects of spotted knapweed invasion on carabid assemblages in Rocky Mountain savannas. November.
- Bleiker K.P.,** and D.L. Six. 2005. WFIWC Student Scholarship Recipient-one hour invited talk to general assembly. Not all fungi are created equal: Interactions among mountain pine beetle and its filamentous fungal associates. Western Forest Insect Work Conference, Victoria, British Columbia, Canada.). April.
- Skov, K.** and D.L. Six. 2005. Fire effects on Douglas-fir beetle reproduction and survival after fire. Student Special Seminar, FABI, University of Pretoria, Pretoria, Republic of South Africa. March 2005.
- Skov, K.** and D.L. Six. 2005. Fire effects on Douglas-fir beetle reproduction in the first year after fire. Western Forest Insect Work Conference, Victoria, Canada. March 2005
- Hansen, A.** and D.L. Six. 2005. Homogenization of ground beetle assemblages mediated by an exotic forb in Rocky Mountain savannas. Student Special Seminar, FABI, University of Pretoria, Pretoria, Republic of South Africa. March 2005.
- Six, D.L.** 2005. Symbiont shifting during larval development and dispersal of the mountain pine beetle. W1187 Western Regional Research Project October 13-14, Columbus, OH.
- Bleiker, K** and D.L. Six. 2005. Effects of mycangial fungi on mountain pine beetle fitness. Entomological Society of America Annual Meeting, Dec. 13-18, Ft. Lauderdale, FL.
- Ayres, M.,** J. Moser, J. Macias-Samano, K. Klepzig, R. Hoffstetter, and D. L. Six. 2005. Fungus-mite interactions with southern and Mexican pine beetles. Southern Forest Work Conference.
- Klepzig, K.D.,** R.W. Hofstetter, and D.L. Six. 2006. Interactions of fungi and tree killing bark beetles: Geographic variation and interspecific competition. 21 August. 7th International Congress of Mycology, Cairns, Australia.
- Six, D.L.,** K. Klepzig, and R. Hofstetter. 2007. Geographic variation in fungi associated with the southern pine beetle, *Dendroctonus frontalis*. IUFRO D7, Vienna, Austria. 11 Sept.
- Six, D.L.,** W. D. Stone, Z. W. de Beer and S. W. Woolfolk. 2007 *Ambrosiella beaveri*, sp. nov., and *Geosmithia* Species Associated with an Exotic Ambrosia Beetle, *Xylosandrus mutilatus* (Coleoptera: Curculionidae, Scolytinae), in Mississippi. Mycological Society of America annual meeting, Baton Rouge, LA.
- Six, D.L.** 2008. Western Regional Research Project W1187-Bark beetles and fungi: Report from Montana. Annual meeting of the Western Regional Research Project W1187, Boulder, CO April 7-10.
- Regoletti, D.** Rich Hofstetter and D. L. Six. 2008. Interactions among bark beetles, fungi and mites--Western Forest Insect Work Conference, Boulder, CO April 7-10.
- Bleiker, K.** and D.L. Six. 2008. Competition and coexistence in a multi-partner mutualism: Interactions between two fungal symbionts of the mountain pine beetle in beetle-attacked trees -Western Forest Insect Work Conference, Boulder, CO April 7-10.

Six, D.L., Z. W. de Beer, A.L. Carroll, and M. J. Wingfield. 2009. *Ophiostoma* and *Grosmannia* associates of the lodgepole pine beetle, *Dendroctonus murrayanae*, and the discovery of a species complex within *Leptographium terebrantis* IUFRO Sept/Oct Jackson Hole, WY. Sept. 11

Massoumi Alamouti, S., D.L. Six, W.Y. Wang, S. Diguistini, J. Bohlman, R. Hamelin, and C. Breuil. 2009. Single nucleotide polymorphism reveal cryptic speciation in *grosmannia clavigera*, a pathogenic fungus associated with the mountain pine and Jeffrey pine beetles. IUFRO Sept/Oct Jackson Hole, WY. Sept. 11

Bracewell, R.R., D.L. Six, and B.J. Bentz. Evolution of sexual size dimorphism in *Dendroctonus* bark beetles. Annual meeting of the Entomological Society of America, San Diego, California, December 12-15, 2010. ***Presidents Prize Winner for best student talk.**

Bracewell, R.R., D.L. Six. The mountain pine beetle as a model of parapatric speciation? North American Forest Insect Work Conference, Portland, Oregon, May 9-12, 2011 (Poster)

Dooley, E.M., D.L. Six. The effects of tree host species and blister rust on mountain pine beetle productivity. University of Montana Graduate Student and Faculty Research Conference. Missoula, Montana, April 24, 2010. (Poster)

Dooley, E.M., D.L. Six. The effects of blister rust severity and host species on mountain pine beetle productivity. High-Five Symposium. The Future of High Elevation Five-Needle White Pines in Western North America. Missoula, Montana, June 28-30, 2010. (Poster).

Dooley, E.M., D.L. Six. The effects of whitebark and lodgepole pine hosts on mountain pine beetle productivity. Questioning Greater Yellowstone's Future Climate, Land Use and Invasive Species, 10th Biennial Scientific Conference on the Greater Yellowstone Ecosystem. Yellowstone National Park, Wyoming, October 11-13, 2010. (Poster).

Dooley, E.M., D.L. Six. Is Whitebark Pine a Better Host for the Mountain Pine Beetle Than Lodgepole Pine? North American Forest Insect Work Conference, Portland, Oregon, May 9-12, 2011. (Poster)

Friedman (Moore), M.L., Six, D. Temperature effects on growth, competition, and sporulation of nutritional symbiotic ophiostomoid fungi associated with *Dendroctonus ponderosae*. North American Forest Insect Work Conference, May 9-12, 2010.

Van der Linde, J., Six, D., Wingfield, M.J. and Roux, J. 2010. Consideration of factors associated with *Euphorbia ingens* decline in the Limpopo Province of South Africa. 36th Annual Conference of the South African Association of Botanists, North-West University, Potchefstroom, 11-15 January 2010.

Van der Linde, J., Six, D., Wingfield, M.J. and Roux, J. 2011. Factors associated with the decline of *Euphorbia ingens* in the Limpopo province, South Africa. 47th Congress of the Southern African Society for Plant Pathology, Kruger National Park, South Africa.

Van der Linde, J., Six, D., Wingfield, M.J. and Roux, J. 2011. Factors associated with the decline of *Euphorbia ingens* in the Limpopo Province, South Africa. 5th Natural Forests and Woodlands symposium, Richards Bay, Kwazulu Natal, South Africa 10-14 April 2011.

Bracewell, R.R. J.M. Good, K.E. Mock, M.E. Pfrender, D.L. Six and B.J. Bentz. 2012. Estimating hybrid male sterility along a geographic gradient in the mountain pine beetle. First Joint Congress on Evolutionary Biology, Ottawa, Ontario, Canada, July 6-10, 2012.

Six, D. L., Moore, M., Addison, A., Powell, J., and B. Bentz. 2014. Temperature influences interactions among bark beetles and symbionts potentially altering geographic range. XXIV IUFRO World Congress, Salt Lake City, UT. Oct 7.

Six, D.L. 2016. The Science of Bark Beetles. The Haskom Science Fusion Seminar. University of Montana, Oct 4.

Six, D. L. and J.A. Hicke. 2018. Genetic-based selection of trees by mountain pine beetle during a climate change-driven outbreak in a high-elevation pine forest. Oct 9-11. PNW Climate Science Conference, Boise Idaho.

Workshops/Conference sessions organized:

Organizer and moderator. Geographic and Genetic Variation in Forest Insect Populations (Workshop). Western Forest Insect Work Conference, Jackson, WY. March 2-5, 1998.

Organizer and moderator. Wilderness for Science: Pros and cons conducting research in wilderness (Dialogue Session). The Wilderness Conference, Missoula, MT. May 23-29, 1999.

Organizer and moderator. Insects of whitebark pine: present knowledge and future directions. (Workshop). Western Forest Insect Work Conference, Feb 7-10, 2000, Portland, Oregon.

Organizer and co-moderator. Restoration Ecology: Incorporating Insects. (Workshop). North American Forest Insect Work Conference. Edmonton, Canada. 15-18 May 2001.

Co-moderator: Towards an integrative understanding of the population dynamics of conifer bark beetles: Incorporating factors from multiple trophic levels (Panel). North American Forest Insect Work Conference. Edmonton, Canada. 15-18 May 2001.

Moderator: Graduate Student Papers Session. Western Forest Insect Work Conference, Whitefish, MT. April 22-26, 2002.

GSA Grant Writing Workshop for Graduate Students- Panel Speaker, graduate students in Forestry and Biology. Spring 2002.

Organized and co-moderated a session entitled "Multi-state Research Project W-187: An example of an integrated approach to studying the impacts of insects and diseases in forest ecosystems" at the Combined meetings of the Western Forest Insect Work Conference and the Western Forest Disease Work Conference. San Diego, CA, April 26-30, 2004.

Organized and co-moderated a session entitled "Insect-fungus interactions: new models of evolution" at Combined meetings of the Western Forest Insect Work Conference and the Western Forest Disease Work Conference. San Diego, CA, April 26-30, 2004.

Organized and co-moderated a session with Meredith Blackwell entitled: Insect associated fungi at the 7th International Congress of Mycology, August 21, 2006. Cairns, Australia.

Co-Instructor – Landscape Ecology Course (two week intensive) – UM Continuing Education – Sept 2007, January 2008, June 2008, January 2009, November 2009

Co-organizer with Kenneth Raffa: Symposium: Insect-Microbe interactions. 2008 Western Forest Insect Work Conference, Boulder, CO April 7-10

Organizer: Conference session: Anthropogenic effects on forest microbe-insect interactions, International Congress of Entomology, Durban, South Africa. July 6-12, 2008

Co-organizer with Barbara Bentz- IUFRO D-7 International conference on bark beetles. Attendance of delegates from over 17 countries. 2009. Jackson Hole, WY

Organized symposium on bark beetle-fungus symbiosis at the IUFRO International Congress of Forestry, Seoul, Korea August, 2010

Program Committee –Talk and session coordinator – Symbiosis in Forest Insects - Western Forest Insect Work Conference, Couer d' Alene, ID, March 2013

Organized symposium “insect microbial symbioses: New discoveries. Entomological Society of America Pacific Branch Meeting Coeur d'Alene, ID. April 2015

Popular articles:

Six, D.L. 2010. Tiny Agents of Forest Change. The Montana Naturalist. Fall issue.

Six, D.L. 2013. The Great Mountain Pine Beetle Expansion. Spring issue, American Forests.

<http://www.americanforests.org/our-programs/endangered-western-forests/mountain-pine-beetles-expansion-in-the-west/>

Six, D.L. 2013. The mountain pine beetle in a changing climate: What does it mean for Montana's forests? Winter issue, Montana Business Quarterly

Videos:

An Evolutionary Marriage (<http://vimeo.com/47101945>)- collaborative effort with MSU Nature Filmmaking Program student Christina Choate that covers work on genomics of the Scolytinae-fungus symbiosis. Funded by NSF.

Select PUBLIC COMMUNICATIONS AND OUTREACH

Among many local, national, and international public talks and presentations each year, these are highlighted:

National Public Radio interview - **All things Considered.** (2011)

Full front page coverage New York Times 2011 '**With Deaths of Forests, a Loss of Key Climate Protectors**' by Justin Gillis <https://www.nytimes.com/2011/10/01/science/earth/01forest.html>

Featured in three chapters of the book “**Empire of the Beetle**” by Andrew Nikiforuk 2011, award winning author of Tar Sands.

Featured in “**The Beetles are Coming**”-an episode on David Suzuki’s The Nature of Things, also included in interactive website accompanying the TV episode. 2013

Feature in episode of Showtime series on climate change “**Years of Living Dangerously**” – Arnold Schwarzenegger, exec. producer. 2014. The show garnered three Emmys including best documentary.

Featured in article on mountain pine beetle in **National Geographic** by award winning science writer Hilary Rosner. <http://ngm.nationalgeographic.com/2015/04/pine-beetles/rosner-text> 2015.

Featured in award winning article by Madie Oatman in **Mother Jones**.
<http://www.motherjones.com/environment/2015/03/bark-pine-beetles-climate-change-diana-six> 2015

TEDx talk entitled “The Great Mountain Pine Beetle Outbreak: A Global Perspective” (chosen for one of 9 talks out of 131 applicants). Sept. 19, 2013. <http://www.youtube.com/watch?v=iSIEzq0fok>

Interviewed in Yale Environment 360 in January 2016
http://e360.yale.edu/feature/how_science_can_help_to_halt_the_western_bark_beetle_plague/2944/

Covered in the Guardian in 2017 <https://www.theguardian.com/environment/2010/mar/16/forests-insects>

Covered in bioGraphic in 2017 <http://www.biographic.com/posts/sto/the-seed-savers>

Featured on Hank Green’s SciShow
<http://www.bing.com/videos/search?q=hank+green+scishow+diana+six&view=detail&mid=FC2D9235DCE499032E34FC2D9235DCE499032E34&FORM=VIRE> 2015
<http://www.bing.com/videos/search?q=scishow+diana++six+update&view=detail&mid=5066EB678E409C1E92C15066EB678E409C1E92C1&FORM=VIRE> 2017

Chosen as ‘scientist client’ for International Wildlife Film Festival LABS. The resulting video ‘The Story of Pine’ was shown at the IWFF 2017 <https://video.nationalgeographic.com/video/short-film-showcase/this-tiny-beetle-is-devastating-forests-in-the-worst-outbreak-ever> Chosen by National Geographic for online video short 2018.

Chosen as featured scientist in Crown of the Continent video. In production. For 2020.

Featured as a lead scientist in full length video for European and potentially US national release on the rewilding of the Bavarian National Forest. Featured with Peter Biedermann, Sebastian Seibold and Jane Goodall. Release August 2020.

HONORS AND AWARDS

Elected **Fellow** of the Royal Society of Entomology May 2019

E.O. Wilson Biodiversity Technology Pioneer Award for seminal research in bark beetle ecology and climate adaptation of forests 2018

Arnold Bolle Conservation Preservation Award 2017

Certificate of Editorial Excellence, Economic Entomology 2016

Editorial award, Symbiosis 2012

Certificate of Editorial Excellence, Insects, 2012

President's Award, West Slope Chapter, Trout Unlimited, 2008

Western Forest Insect Work Conference 'humor' award 2007

At University of California, Riverside, CA

National Science Foundation, Honorable Mention 1991

Teaching Assistant of the Year, 1994, Department of Entomology

Inducted to Sigma Xi, Full Member, 1996

Gamma Sigma Delta, Graduate Dissertation Award, 1997

Comstock Award (top chapter honor), Entomological Society of America, Pacific Branch award 1997

Comstock Award, Entomological Society of America, National award for outstanding graduate work, 1997 (top national honor)

At California State Polytechnic University, Pomona, CA

Gamma Sigma Delta Honor Society- Nominated and inducted junior year, 1989

Student of the Year-College of Agriculture, AgBiology, 1989

CAPCA Statewide Scholarship, 1989

Agricultural Biology Leadership Award, 1990

At Chaffey College, Alta Loma, CA

Lubarsky Microbiology Scholarship. 1986

R. Beeks Botany Award, 1986

Life Science Division Special Award-most outstanding student, 1986

Gold "C" Award (outstanding service to the college), 1987

PROFESSIONAL ASSOCIATIONS

Entomological Society of America: Member 1987-

Society for Invertebrate Pathology: Member 1991-2005

Mycological Society of America: Member 1994-2013

W-187 Regional Research Project 1998-2008

Ecological Society of America 2016-

International Symbiosis Society 2002-

The Society for Evolution 2005-2010, 2013-

International Mycological Society 2003-

International Entomological Society 2004-

The American Phytopathological Society 2000-2005

The Orthopterists Society 2002-2006

Gamma Sigma Delta 1992-

Western Forest Work Conference 1992-

IUFRO-Division 7.03.05 1999-present, section secretary 2015-2018

Fellow Royal Entomological Society 2019-

National Academies of Science, Engineering, and Medicine Committee on the Use of Biotechnology to Address Forest Health – 2017-2019. Report published in 2019.

SERVICE

NSF PACE-Partnership for Comprehensive Equity (2003-2006)

Co-principle Investigator UM PACE-NSF ADVANCE Institutional change grant (\$3,500,000).

Served on PACE Executive Committee

Served on PACE Campus-Wide Policy Committee

Served as Director of PACE UM Mentoring Program for Women in Science

Developed, direct, and evaluate the mentoring program for women faculty, organize graduate student mentoring programs, organize “Women in Science” lunches, present mentoring workshops for faculty and administration, and manage the “Women in Science” mentoring database.

University Service

Department of Ecosystem and Conservation Sciences

Developed departmental mentoring program for new faculty 2003

Committee for program review 2003

Chair, curriculum development committee – developed new major in Restoration

Ecology 2004-2006

Search Committee – Restoration Ecology position 2005

Restoration Ecology Curriculum Committee 2007-present

Advising: typically advise 10-25 undergraduates each year

Advise graduate students

Ecological Restoration Program-advisor -2005-present

Chair, 2013-2016

College of Forestry and Conservation

Graduate Committee – 1998-1999, Chair 2006-2008, ex officio 2009-2011

Academic Affairs Committee– 2001-2004

Chair 2002-2004

Search Committee – Watershed Science 2000, 2001

Mission and Vision Committee 2007-2008

College Council 2008-2010

Lubrecht/Bandy Committee-2010-11

Administered Irene Evers Undergraduate Scholarships – 2000 to 2013

Communications Committee – Chair 2011-2012

Guest lectures given by course:

FOR 180 Spring 2009 (3 lectures), Spring 2010 (1 lecture), spring 2011, Fall 2012

FOR 330 Fall 1997

FOR 272 Spring 1998, 1999, 2000, 2001, 2002

FOR 480 Fall 1998, 1999

FOR 395 Fall 2000

FOR 200 Taught Insect and disease modules summers 1999-2003

Rebuilt, expanded, and curated the Entomology Teaching Collection 1997-2000.

BIOL 110 Spring 2010

NRMS 265 Fall 2013, 2014, 2015

NRMS 465 Spring 2016 (5 lectures and major writing assignments)

Search Committee, Chair – Restoration Ecologist 2005-2006
Search Committee – Dean of the College of Forestry and Conservation 2011

University

Faculty Senate 2003-2006, 2007-2010
UM Integrated Plant Management Committee 1998-2005
UM coordinator for biological control releases on Mt. Sentinel 1998-1999
Search Committee – WBIO (DBS) Physiological Ecologist 1998
UMCUR Undergraduate Research – 2006
President’s International Committee 2007-2012
Provost’s Academic Strategic Plan Implementation Committee 2010-2012
Search Committee – Associate Provost for Research – 2010
Implementation Committee for the Academic Strategic Plan (ICASP) 2009-2010
University Strategic Plan Advancement Committee (USPAC) 2010-2011
 Programs of Distinction subcommittee 2011-2012
Vice President of Research and Creative Scholarship’s Research Council
 2013-2015: Member of full committee and co-chair of subcommittee on Guidelines and
 Procedures.
Search committee: FLBS Aquatic microbial ecologist 2016
Search committee: Host-symbiont interactions CMMB 2016
Search Committee: Environmental Journalism 2017
Search Committee: President of the University of Montana 2017
President’s transition team – 2017-2018

Mentor – President’s Women’s Leadership Initiative 2015-
 Mentor-WLI Fireside chats-gender bias, engaging men in promoting equity Feb 2016
Member - President’s Committee on promoting Ecology and the Environment 2015-2016

International

Served as external examiner – Robert Mueller, PhD, 2019, Australia

Division Deputy for Division 7 of IUFRO (International Union of Forest Research organizations) section 03.05 Bark and Wood Boring Insects 2015-2019

Serve on the board of directors for the Centre of Excellence for Tree Health Biotechnology at the University of Pretoria, Pretoria, South Africa. 2004-to present

Member - Advisory Board – ISEFOR Increasing Sustainability of European Forests: Modeling for Security Against Invasive Pests and Pathogens under Climate Change. European Union 7th Framework. Oversight of 13 million dollar USD multi-year collaborative research project involving researchers in ten countries. 2010-2013.

Served as external examiner for Ylva Strid for PhD defense. Advisor Jan Stenlid, University of Agricultural Sciences, Uppsala, Sweden, 2012.

Served as external examiner for PhD defense, Rikka Linnakoski. Finland, 2011

Served as external examiner for PhD defense, Grace Nakabonge, Advisor Jolanda Roux, University of Pretoria, Pretoria, South Africa, 2006.

Served as external examiner for PhD defense, Matthew Greiff. Advisor: Randy Currah, University of Alberta, Edmonton, Canada, 2006.

Served as external examiner for PhD defense, Suzanne Kuhnholz. Advisor John Borden, Simon Fraser University, Vancouver, Canada. 2004.

Co-advised MS student Johan Vanderlinde – University of Pretoria 2008-2011

Co-advise PhD student Johan Vanderlinde - University of Pretoria 2012-present

Served as external examiner, Janneke Aylward, PhD Candidate, University of Stellenbosch, Cape Town, South Africa 2016.

Professional Service

Reviewer for: Symbiosis, Canadian Journal of Botany, Forest Science, Environmental Entomology, Conservation Biology, Canadian Journal of Forest Research, Mycologia, Journal of Economic Entomology, Forest Ecology and Management, Journal of Chemical Ecology, Journal of Forestry, Mycological Research, FEMS Microbiology Ecology, Microbial Ecology, Plant Disease, Current Biology, Oecologia, Ecology, Plant Pathology, Ecological Applications, Science, Evolution, Royal Letters Entomology, Bioscience, The Auk, Nature, Western Journal of Applied Forestry, Antonie van leuwenhoek, Plant Disease, Ecology Letters, Proceedings of the Royal Society B, Biological Letters, Evolution, Forest Pathology, Agricultural and Forest Entomology, Weed Research, Journal Royal Society Interface, Rapid Communications in Mass Spectrometry, Insects, The Holocene, PNAS, ISME, Microbial Ecology, PLoS One, PeerJ, Ecology Letters, Current Biology, Nature Climate Change, Nature Microbiology and others

Reviews/panels: NSF DEB (2005, 2007, 2008, 2009, 2010, 2011, 2013, 2014, 2015, 2016, 2017), NSF EPSCoR reverse site visit (2013), USDA NRI (ad hoc 2002, 2003), USDA NNP (ad hoc 2009, 2017), USDA Critical Issues program (2009), Montana Noxious Weed Control Association (1998, 1999), Czech Republic National Science Foundation (2005, 2007, 2009), Panelist USDA NRI entomology and nematology program (2006), NRF South Africa (2006, 2007, 2008, 2009, 2010, 2011). Austria Science Foundation 2016, USDA SBIR 2016, USDA NIFA 2016.

Other:

Secretary 1999-2000 Western Regional Research Project W-187. Conifer, Bark Beetle, Fungal Interactions in North American Forests.

Chair 2000-2001 Western Regional Research Project W-187. Conifer, Bark Beetle, Fungal Interactions in North American Forests.

Steering Committee-NAFIWIC 2010, Portland, OR

Program Committee- WFIWC, 2013, Coeur d Alene, ID

Lynne Rieske University of Kentucky – Promotion and tenure package 2007

Jolanda Roux University of Pretoria – Promotion package 2011

Barbara Bentz USFS- Promotion package 2012

Melissa Fierke – Promotion and tenure package SUNY 2012

Local arrangements, Western Regional Research Project W-187, Oct. 1999, Missoula, MT
Steering Committee, North American Forest Insect Work Conference, Edmonton, Canada, 2000-2001.

Program Committee, Western Forest Insect Work Conference, 2001-2002. Whitefish, MT April 2002

J. LeFage Scholarship Committee, Pacific Branch Representative – 2001-2003. Entomological Society of America.

Common Names Committee-WFIWC/Entomological Society of America. 2005

Local arrangements, Western Regional Research Project W-187, Oct. 2006, Missoula, MT

Co-organizer, IUFRO international conference on bark beetle management, Jackson, WY
September 26-30 2009

Met for one hour (initially I was granted 20 minutes but he extended meeting) with Dept of Interior Assistant to the Secretary, Michael Bean, to present results of a survey in GYE that indicated that close to one million acres of whitebark pine had been killed by the mountain pine beetle. Meeting was held in regard to grizzly ESA listing. Washington DC, Jan 2010.

Member of external evaluation team for review of NAU School of Forestry's Graduate Programs. 2011. I wrote final report. The dean considered it the best, most informative and useful report he had been presented.

Invited expert at "emergency" conference and panel on new introduction of polyphagous shothole borer into Southern California attacking native oaks, avocados and many other urban and wildland tree species. Riverside, CA. Sept. 2012.

AIBS webinar and 'talking point' training for speaking with congressional representatives July 2013

Chair training, University of Montana, September 2014

Training for chairs, FEC, University of Montana, September 2014

Union of Concerned Scientists training on communicating with stakeholders on climate change issues, Fairmont Hot Springs, MT August 2014.

Mentoring:

Participation in MT-TIE (Montana Teachers Investigate Ecology) program- This is an NSF program that pairs university professors with junior and high school science teachers for summer research experience. Teacher mentee: Lee Coble from Polson Middle School 2001.

2016: Participation with BANR in taking experimental research to the classroom. – Two high school teachers from Montana conduct research on restoration of whitebark pine

Participation in Project TRAIN – This is an NSF program focusing on increasing numbers of American Indian students entering graduate school and careers in environmental science.

Mentees:

Joel Adams 2001, 2002, 2003 Project “Effect of white pine blister rust infection on mountain pine beetle preference in whitebark pine”

Lloyd Tallbull 2002 Project “Effect of water relations and white pine blister rust on resin flow in whitebark pine”

Natani Pete 2003 Project “Effect of prescribed fire on resin defenses of ponderosa pine”

Trevor Lasher 2010-12 “Susceptibility of the natural enemies of mountain pine beetle to the fungal biopesticide, *Beauveria bassiana*”

PNW COSMOS – mentor in training - NSF funded program supporting graduate education of Native American students 2015 to present

High School mentoring: Christina Tripp, Big Sky High School. 2010-2011. One year project looked at the fungal symbionts and pathogens of the bark beetle, *Ips pini*. I worked weekly with Christina on her project after school.

Classrooms without walls (high school): 2016, 2017, 2018

I have provided undergraduate research and intern opportunities to over 54 undergraduate students.

*This is a **very** incomplete list of service activities. I do a lot more but forget to track them much of the time.*