

M. CHAD BOLDING, PHD
Professor and Langdale Endowed Chair in Forest Business
Harley Langdale Jr. Center for Forest Business
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EDUCATION

2006 **Ph.D., Forest Engineering**, Oregon State University, Corvallis, OR.
2005 **M.F., Forest Science**, Oregon State University, Corvallis, OR.
2002 **M.S., Forestry**, Auburn University, Auburn, AL.
2000 **B.S., Forestry**, Auburn University, Auburn, AL.

PROFESSIONAL EXPERIENCE

06/2022 – **Professor and Langdale Endowed Chair in Forest Business**
Harley Langdale Jr. Center for Forest Business,
Warnell School of Forestry and Natural Resources,
University of Georgia, Athens, GA.

07/2020 – 05/2022 **Professor of Forest Operations/Engineering**

07/2012 – 06/2020 **Associate Professor of Forest Operations/Engineering**

08/2008 – 06/2012 **Assistant Professor of Forest Operations/Engineering**
Department of Forest Resources and Environmental Conservation,
Virginia Polytechnic Institute and State University, Blacksburg, VA.

08/2006 – 08/2008 **Assistant Professor of Forest Operations and Harvesting**
Department of Forestry and Natural Resources, Clemson
University, Clemson, SC.

TEACHING EXPERIENCE (LEAD INSTRUCTOR)

2009 - 2020 Timber Procurement (FREC 3734)
2008 - 2021 Forest Harvesting (FREC 3714)
2010 - 2021 Harvesting Systems Evaluation (FREC 4714)
2010 - 2021 Advanced Harvesting Systems Evaluation (FREC 5714G)
2020 - 2021 Professional Skills in Natural Resources (FREC/NR 4004)
2021 - 2022 Forest Fiber Supply (FREC 3734)

RESEARCH AND TEACHING INTERESTS

Forest harvesting logistics; forest business issues; engineering economic analysis; wood supply chain efficiency; fiber procurement; woody biomass utilization; environmental impacts and best management practices; workforce and safety issues; professional skills and career preparedness

GRADUATE STUDENT ADVISING AND RELATED AWARDS

- Chair or co-chair for 30 completed graduate students (2 MFR, 14 MF, 7 MS, 7 PhD)
- 2 current students (1 MFR, 1 PhD)

- 2020 Outstanding Graduate Student Mentor Award, College of Natural Resources and Environment, VT - Awarded by the Graduate School to one faculty member in each college
- 2022 Certificate of Teaching Excellence and Outstanding Teaching Award, College of Natural Resources and Environment, VT - Awarded to one faculty member in each college

SUMMARY OF ACADEMIC EXPERIENCES AND SUCCESSES

- Chair or co-chair for 30 completed (1 current) graduate students (7 PhD, 23 MS/MF/MFR) and recipient of the 2020 Outstanding Graduate Mentor Award, College of Natural Resources and Environment. The award is presented by the Virginia Tech Graduate School to one faculty member from each college for their role in supporting, encouraging, and promoting a positive and inclusive scholarly and teaching environment, and for contributing to professional and personal development of graduate students.
- PI or Co-PI of 50 research grants totaling \$14,216,658 with \$1,781,328 directly controlled and author or co-author of 65 peer-reviewed journal articles. I am Co-PI, leadership team member, and co-lead of the sustainability task of a current \$10 Million USDA AFRI SAS project entitled: Mid-Atlantic Sustainable Biomass Products Consortium (MASBio).
- Establishment of a successful teaching program that is training our upcoming natural resource stewards and includes four primary courses in which I am the lead instructor: FREC 3714 Forest Harvesting, FREC 3734 Forest Fiber Supply, FREC/NR 4004 Professional Skills in Natural Resources, and FREC 4714/5714G Harvesting Systems Evaluation.
- Director of the VT Forest Operations and Business Research Cooperative consisting of fifteen-member companies collaboratively participating in applied research (2008-2022).
- Participant in the 2021 VT College of Natural Resources and Environment *Academic Leadership and Administration Academy* designed to build academic leadership skills. Topics include: vision and management in leadership roles, funding and budgeting, advisory councils, government relations, advancement, and capital planning.
- Faculty Scholar, Inclusive Excellence at Virginia Tech (2019-2021) – one of a three-member Department of Forest Resources and Environmental Conservation faculty cohort. The purpose of the program, funded by the Howard Hughes Medical Institute, is to implement, assess, and improve the learning environments for students from underrepresented groups at VT.
- Developed and currently teach a new course entitled: “FREC/NR 4004 Professional Skills in Natural Resources”. This course focuses on the “soft skills” that are necessary for professional success. Instruction includes skills for effective and ethical professional interaction including written and oral communication, advancement of diversity and inclusion, and personal responsibility. Career preparation principles including employer outreach, job seeking, resume writing, and interview preparation are also covered.
- Supervise and complete performance evaluations for a full-time research technician (2014 - 2022).
- Leader in appropriate professional societies and host of two international conferences.
- Associate Editor and Editorial Board Member for two peer-reviewed journals: *Forest Science* and *International Journal of Forest Engineering*.
- Service on numerous Department, College, and University committees. Recently served on the FREC Budget and Planning Committee and worked collaboratively with the Department Head and other faculty members to develop a departmental strategic plan that aligned

department, college, and university objectives and initiatives. Plan development included surveys to faculty, staff, and students and a faculty retreat.

- Chair, FREC Department Head 5-year comprehensive review committee.
- University-level Promotion and Tenure Committee (College of Natural Resources and Environment representative).

CURRENT SPONSORED RESEARCH AWARDS (TOTAL: \$14,161,658; PI: \$1,726,328)

- Wang, J. (PI), R. Bergman, D. Bhattacharyya, **M.C. Bolding (Co-PI and Leadership Team Member)**, T. Brown, E. Brzostek, R. Burns, D. Ciolkosz, Z. Freedman, S. Grushecky, D. Hartley, J. Hu, J. Hubbard, M. Langholtz, J. Leahy, B. Li, X. Li, J. Liu, L. McDonald, D. McGill, J. Schuler, J. Skousen, E. Thomchick, T. Volk, and S. Wurzbacher. (2020-2025). Mid-Atlantic Sustainable Biomass for Value-added Products Consortium (MASBio). USDA National Institute of Food and Agriculture Sustainable Agriculture Systems. **\$10,000,000**.
- Carter, D., A. Coates, **M.C. Bolding (Co-PI)**. (2020-2025). Landscape Level Restoration of Shortleaf Pine/Oak Stands in the Appalachian Region. USDA Forest Service. **\$274,508**.
- Wang, J., **M.C. Bolding (Co-PI)**, T. Gallagher, A. Kizha, and D. Hartley. (2019-2022). Advancing Forest Logging Residue Harvesting and Collection Logistics in the Eastern U.S. USDA National Institute of Food and Agriculture. **\$1,000,000**.
- **Bolding, M.C. (PI)**. (2022-2023). Improving Supply Chain Efficiency by Evaluating Forest Transportation Obstacles in the Southeastern U.S. John Deere Construction and Forestry Company. **\$55,000**.
- **Bolding, M.C. (PI)**, W.M. Aust, and S.M. Barrett. (2018-2021). Monitoring and Quantifying the Effects of State Forestry BMP Programs on Soil Erosion and Sediment Delivery for the Southeastern United States. Sustainable Forestry Initiative. **\$120,000**. The National Council for Air and Stream Improvement. **\$150,000**.

PEER REVIEWED JOURNAL PUBLICATIONS (65 total, 55 with students*)

Google Scholar Citations: 1586; h-index: 23; i10-index: 45

- Hawks, B.S.*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, and E.B. Schilling. (in press). Audit procedures and implementation rates for forest water quality best management practices in the 13 southeastern states. Accepted on 1/17/22 by: *Journal of Soil and Water Conservation*.
- Garren, A.M.*, **M.C. Bolding**, W.M. Aust, S.M. Barrett, and T.A. Coates. (in press). Evaluating the productivity and costs of five energywood harvesting operations in the lower Mid-Atlantic region of the U.S. Accepted on 12/5/21 by: *International Journal of Forest Engineering*.
- Garren, A.M.*, **M.C. Bolding**, S.M. Barrett, W.M. Aust, and T.A. Coates. 2022. Characteristics of forest biomass harvesting operations and markets in Virginia. *Biomass and Bioenergy* 163:106501.
- Hawks, B.S.*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, E.B. Schilling, and S.P. Prisley. 2022. Increased levels of forestry best management practices reduce sediment delivery from Middle and Lower Coastal Plain clearcut harvests and access features, Southeastern States, USA. *Forest Ecology and Management* 519:120323.
- Garren, A.M.*, **M.C. Bolding**, S.M. Barrett, W.M. Aust, and T.A. Coates. 2022. Best management practices, estimated erosion, residual woody debris, and ground cover

characteristics following biomass and conventional clearcut harvests in Virginia's Mountains. *Forest Science* 68:299-311.

- Fielding, J.A.H*, B.S. Hawks*, W.M. Aust, **M.C. Bolding**, and S.M. Barrett. 2022. Estimated erosion from clearcut timber harvests in the southeastern United States. *Forest Science* 68:334-342.
- Hawks, B.S.* , **M.C. Bolding**, W.M. Aust, S.M. Barrett, E.B. Schilling, and C.N. Horton*. 2022. Implementation of forestry best management practices and sediment delivery in three regions of North Carolina and Virginia. *Forest Science* 68(1):63-74.
- Cook, E.B.* , **M.C. Bolding**, R. Visser, S.M. Barrett, and B.S. O'Neal. 2022. Assessing the characteristics and supporting factors that lead to logging machine value loss in the Southeastern United States. *International Journal of Forest Engineering* 33(1):33-42.
- Hawks, B.S.* , W.M. Aust, **M.C. Bolding**, S.M. Barrett, E.B. Schilling, and J.A.H. Fielding*. 2022. Linkages between forestry best management practices and erosion in the southeastern U.S. *Journal of Environmental Management* 305:114411.
- Hahn, G.E.* , T.A. Coates, W.M. Aust, **M.C. Bolding**, and M.A. Thomas-Van Gundy. 2021. Long-term impacts of silvicultural treatments on wildland fuels and modeled fire behavior in the Ridge and Valley Province, Virginia (USA). *Forest Ecology and Management* 496:119475.
- Aust, W.M., **M.C. Bolding**, and S.M. Barrett. 2020. Silviculture in forested wetlands: summary of current forest operations, potential effects, and long-term experiments. *Wetlands* 40(1):21-36.
- Cristan, R.* , W.M. Aust, **M.C. Bolding**, and S.M. Barrett. 2019. Estimated sediment protection efficiencies for increasing levels of best management practices on forest harvests in the Piedmont, USA. *Forests* 10(997):1-21.
- Dangle, C.L.* , **M.C. Bolding**, W.M. Aust, S.M. Barrett, and E.B. Schilling. 2019. Best management practices influence modeled erosion rates at forest haul road stream crossings in Virginia. *Journal of the American Water Resources Association* 55(5):1169-1182.
- Garren, A.M.* , **M.C. Bolding**, W.M. Aust, A.C. Moura, and S.M. Barrett. 2019. Soil disturbance effects from tethered forwarding on steep slopes in Brazilian eucalyptus plantations. *Forests* 10(721):1-21.
- Cole, N.B.* , S.M. Barrett, **M.C. Bolding**, and W.M. Aust. 2019. An analysis of fatal log truck crashes in the United States from 2011 through 2015. *International Journal of Forest Engineering* 30(2):121-131.
- Dangle, C.L.* , W.M. Aust, **M.C. Bolding**, S.M. Barrett, E.B. Schilling, and M. Poirot. 2019. Characteristics, predicted erosion, and costs for different levels of forestry best management practices at skidder and truck stream crossings in the mountains, piedmont, and coastal plains of Virginia, USA. *International Journal of Forest Engineering* 30(2):76-86.
- Howell, R.* , W.M. Aust, and **M.C. Bolding**. 2019. Forestry best management practices and modeled erosion on planned and logger-selected bladed skid trails in the ridge and valley region, Virginia, USA. *International Journal of Forest Engineering* 30(2):68-75.
- Dangle, C.L.* , W.M. Aust, **M.C. Bolding**, S.M. Barrett, and E.B. Schilling. 2019. The effectiveness of forestry best management practices at skidder stream crossings in Virginia. *Journal of Soil and Water Conservation* 74(3):199-208.
- Lang, A.J.* , W.M. Aust, **M.C. Bolding**, K.J. McGuire, and E.B. Schilling. 2018. Best management practices influence sediment delivery from road stream crossings to mountain and piedmont streams. *Forest Science* 64(6):682-695.

- Cristan, R.*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, and J.F. Munsell. 2018. National status of state developed and implemented forestry best management practices for protecting water quality in the United States. *Forest Ecology and Management* 418:73-84.
- Parkhurst, B.M.*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, and E.A. Carter. 2018. Soil response to skidder trafficking and slash application. *International Journal of Forest Engineering* 29(1):31-40.
- Vinson, J.A.*, S.M. Barrett, W.M. Aust, and **M.C. Bolding**. 2017. Comparing the suitability of soil erosion models for the evaluation of bladed skid trail BMPs in the Southern Appalachians. *Forests* 8(482):1-18.
- Barrett, S.M., **M.C. Bolding**, and J.F. Munsell. 2017. Characteristics of logging businesses across Virginia's diverse physiographic regions. *Forests* 8(468):1-13.
- Kim, S., M.A. Nussbaum, A.L. Schoenfish, S.M. Barrett, **M.C. Bolding**, and D.E. Dickerson. 2017. Occupational safety and health concerns in logging: a cross-sectional assessment in Virginia. *Forests* 8(440):1-12.
- Lang, A.J.*, W.M. Aust, **M.C. Bolding**, K.J. McGuire, and E.B. Schilling. 2017. Forestry best management practices for erosion control in haul road ditches near stream crossings. *Journal of Soil and Water Conservation* 72(6):607-618.
- Neaves, C.M.*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, C.M. Trettin, and E.D. Vance. 2017. Soil properties in site prepared loblolly pine (*Pinus taeda* L.) stands 25 years after wet weather harvesting in the lower Atlantic coastal plain. *Forest Ecology and Management* 404:344-353.
- Warrington, B.M.*, W.M. Aust, S.M. Barrett, W.M. Ford, C.A. Dolloff, E.B. Schilling, T.B. Wigley, and **M.C. Bolding**. 2017. Forestry best management practices relationships with aquatic and riparian fauna: a review. *Forests* 8(331):1-16.
- Vinson, J.A.*, S.M. Barrett, W.M. Aust, and **M.C. Bolding**. 2017. Evaluation of bladed skid trail closure methods in the ridge and valley region. *Forest Science* 63(4):432-440.
- Neaves, C.M.*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, C.M. Trettin, and E.D. Vance. 2017. Loblolly pine (*Pinus taeda* L.) productivity 23 years after wet site harvesting and site preparation in the lower Atlantic Coastal Plain. *Forest Ecology and Management* 401:207-214.
- Saulnier, W.J.*, **M.C. Bolding**, S.M. Barrett, and S.P. Prisley. 2017. Characteristics of Virginia's private forest landowners and their attitudes toward harvesting. *Forest Products Journal* 67(1/2):69-80.
- Lang, A.J.*, W.M. Aust, **M.C. Bolding**, K.J. McGuire, and E.B. Schilling. 2017. Comparing sediment trap data with erosion models for evaluation of forest haul road stream crossing approaches. *Transactions of the ASABE* 60(2):393-408.
- Conrad, J.L.*, IV, M.M. Vokoun, S.P. Prisley, and **M.C. Bolding**. 2017. Barriers to logging production and efficiency in Wisconsin. *International Journal of Forest Engineering* 28(1):57-65.
- Hanzelka, N.C.*, J. Sullivan, **M.C. Bolding**, and S.M. Barrett. 2016. Economic feasibility of utilizing pre-commercially thinned southern pine as a woody biomass energy source. *Forest Products Journal* 66(5/6):354-361.
- Morris, B.C.*, **M.C. Bolding**, W.M. Aust, K.J. McGuire, E.B. Schilling, and J. Sullivan. 2016. Differing levels of forestry best management practices at stream crossing structures affect sediment delivery and installation costs. *Water* 8(92):1-18.

- Barrett, S.M.*, W.M. Aust, **M.C. Bolding**, W.A. Lakel III, and J.F. Munsell. 2016. Implementation of forestry best management practices on biomass and conventional harvesting operations in Virginia. *Water* 8(89):1-9.
- Hanzelka, N.C.*, **M.C. Bolding**, J. Sullivan, and S.M. Barrett. 2016. Productivity and costs of utilizing small-diameter stems in a biomass-only harvest. *International Journal of Forest Engineering* 27(1):43-52.
- Barrett, S.M.*, W.M. Aust, **M.C. Bolding**, W.A. Lakel III, and J.F. Munsell. 2016. Estimated erosion, ground cover, and best management practices audit details for postharvest evaluations of biomass and conventional clearcut harvests. *Journal of Forestry* 114(1):9-16.
- Cristan, R.*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, J.F. Munsell, and E.B. Schilling. 2016. Effectiveness of forestry best management practices in the United States: literature review. *Forest Ecology and Management* 360:133-151.
- Lang, A.J.*, R. Cristan*, W.M. Aust, **M.C. Bolding**, B.D. Strahm, E.D. Vance, and E.T. Roberts, Jr. 2016. Long-term effects of wet and dry site harvesting on soil physical properties mitigated by mechanical site preparation in coastal plain loblolly pine (*Pinus taeda*) plantations. *Forest Ecology and Management* 359:162-173.
- Nolan, L.*, W.M. Aust, S.M. Barrett, **M.C. Bolding**, K. Brown*, and K.J. McGuire. 2015. Estimating costs and effectiveness of upgrades in forestry best management practices for stream crossings. *Water* 7:6946-6966.
- Lang, A.J.*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, K.J. McGuire, and W.A. Lakel III. 2015. Streamside management zones compromised by stream crossings, legacy gullies, and over-harvest in the Piedmont. *Journal of the American Water Resources Association* 51(4):1153-1164.
- Aust, W.M., **M.C. Bolding**, and S.M. Barrett. 2015. Best management practices for low-volume forest roads in the Piedmont region: summary and implications of research. *Journal of the Transportation Review Board* 2472(1):51-55.
- Barrett, S.M.*, **M.C. Bolding**, W.M. Aust, and J.F. Munsell. 2014. Characteristics of logging businesses that harvest biomass for energy production. *Forest Products Journal* 64(7/8):265-272.
- Passauer, D.P.*, W.M. Aust, **M.C. Bolding**, B.D. Strahm, J.M. Burger, S.C. Patterson, E. Vance, and E.T. Roberts Jr. 2013. Potential above-ground biomass losses from severe soil rutting during wet weather timber harvests of coastal plain loblolly pine (*Pinus taeda*) plantations mitigated by mechanical site preparation. *Forest Ecology and Management* 307:266-273.
- Conrad, J.L.*, **M.C. Bolding**, W.M. Aust, R.L. Smith, and A. Horcher. 2013. Harvesting productivity and costs when utilizing energywood from pine plantations of the southern Coastal Plain USA. *Biomass and Bioenergy* 52:85-95.
- Wear, L.R.*, W.M. Aust, **M.C. Bolding**, B.D. Strahm, and C.A. Dolloff. 2013. Effectiveness of best management practices for sediment reduction at operational forest stream crossings. *Forest Ecology and Management* 289:551-561.
- Wade, C.R.*, **M.C. Bolding**, W.M. Aust, and W.A. Lakel III. 2012. Comparison of five erosion control techniques for bladed skid trails in Virginia. *Southern Journal of Applied Forestry* 36(4):191-197.
- Sawyers, B.C.*, **M.C. Bolding**, W.M. Aust, and W.A. Lakel III. 2012. Effectiveness and implementation costs of overland skid trail closure techniques in the Virginia piedmont. *Journal of Soil and Water Conservation* 67(4):298-308.

- Wade, C.R.* , **M.C. Bolding**, W.M. Aust, W.A. Lakel III, and E.B. Schilling. 2012. Comparing sediment trap data with the USLE-Forest, RUSLE2, and WEPP-Road erosion models for evaluation of bladed skid trail BMPs. *Transactions of ASABE* 55(2):403-414.
- Barrett, S.M., **M.C. Bolding**, and J.F. Munsell. 2012. Evaluating continuing education needs and program effectiveness using a survey of Virginia's SHARP Logger program participants. *Journal of Extension* [Online], 50(1) Article 1RIB8. Available at: <http://www.joe.org/joe/2012february/rb8.php>
- McKee, S.E.* , L.A. Shenk* , **M.C. Bolding**, and W.M. Aust. 2012. Stream crossing methods, costs, and closure best management practices for Virginia loggers. *Southern Journal of Applied Forestry* 36(1):33-37.
- Conrad, J.L.* , W.S. Ford* , M.C. Groover* , **M.C. Bolding**, and W.M. Aust. 2012. Virginia Tech forest road and bladed skid trail cost estimation method. *Southern Journal of Applied Forestry* 36(1):26-32.
- Munsell, J.F., S.M. Barrett, and **M.C. Bolding**. 2011. An exploratory study of biomass harvesting among logging firms in Virginia and North Carolina. *Forest Science* 57(5):427-434.
- Aust, W.M., M.B. Carroll* , **M.C. Bolding**, and C.A. Dolloff. 2011. Operational forest stream crossings effects on water quality in the Virginia Piedmont. *Southern Journal of Applied Forestry* 35(3):123-130.
- Worrell, W.C.* , **M.C. Bolding**, and W.M. Aust. 2011. Potential soil erosion following skyline yarding versus tracked skidding on bladed trails in the Appalachian region of Virginia. *Southern Journal of Applied Forestry* 35(3):131-135.
- Conrad, J.L.* and **M.C. Bolding**. 2011. Virginia's woody biomass market: opportunities and implications. *Southern Journal of Applied Forestry* 35(2):67-72.
- Conrad, J.L.* , **M.C. Bolding**, R.L. Smith, and W.M. Aust. 2011. Wood-energy market impact on competition, procurement practices, and profitability of landowners and forest products industry in the U.S. south. *Biomass and Bioenergy* 35(1):280-287.
- Lakel III, W.A., W.M. Aust, **M.C. Bolding**, C.A. Dolloff, P. Keyser, and R. Feldt. 2010. Sediment trapping by streamside management zones of various widths after forest harvest and site preparation. *Forest Science* 56(6):541-551.
- Conrad, J.L.* , **M.C. Bolding**, W.M. Aust, and R.L. Smith. 2010. Wood-to-energy expansion, forest ownership changes, and mill closure: Consequences for U.S. South's wood supply chain. *Forest Policy and Economics* 12(6):399-406.
- **Bolding**, **M.C.**, S.M. Barrett, J.F. Munsell, and M.C. Groover. 2010. Characteristics of Virginia's logging businesses in a changing timber market. *Forest Products Journal* 60(1):86-93.
- **Bolding**, **M.C.**, L.D. Kellogg, and C.T. Davis. 2009. Soil compaction and visual disturbance following an integrated mechanical forest fuel reduction operation in southwest Oregon. *International Journal of Forest Engineering* 20(2):47-56.
- Moldenhauer, M.C.* and **M.C. Bolding**. 2009. Parcelization of South Carolina's private forestland: Loggers' reactions to a growing threat. *Forest Products Journal* 59(6):37-43.
- **Bolding**, **M.C.**, L.D. Kellogg, and C.T. Davis. 2009. Productivity and costs of an integrated mechanical forest fuel reduction operation in southwest Oregon. *Forest Products Journal* 59(3):35-46.

- **Bolding, M.C.** and B.L. Lanford. 2005. Wildfire fuel harvesting and resultant biomass utilization using a cut-to-length / small chipper system. *Forest Products Journal* 55(12):181-189.
- Murphy, G.E., H.D. Marshall, and **M.C. Bolding**. 2004. Adaptive control of bucking on harvesters to meet order book constraints. *Forest Products Journal* 54(12):114-121.

PEER REVIEWED JOURNAL PUBLICATIONS UNDER REVIEW (4)

- Horton, C.N.*, S.M. Barrett, B.S. Hawks*, W.M. Aust, and **M.C. Bolding**. (in review). Access feature areas within clearcut harvests by region across the Southeastern U.S. Submitted on 3/10/22 to: *International Journal of Forest Engineering*.
- Garren, A.M.*, **M.C. Bolding**, S.M. Barrett, E.M. Hawks*, W.M. Aust, and T.A. Coates. (in review). A meta-analysis of forest biomass and conventional harvesting effects on estimated erosion, BMP implementation, ground cover, and residual woody debris in Virginia. Submitted on 4/1/22 to: *Journal of Forestry*.
- Hawks, B.S.*, **M.C. Bolding**, W.M. Aust, S.M. Barrett, E.B. Schilling, and S.P. Prisley. (in review). Increased levels of forestry best management practices reduce sediment delivery from Mountain clearcut harvests and access features, southeastern states, USA. Submitted on 5/9/22 to: *Forest Ecology and Management*.
- Hawks, E.M.*, **M.C. Bolding**, W.M. Aust, and S.M. Barrett. (in review). Best management practices, erosion, residual woody biomass, and soil disturbances within biomass and conventional clearcut harvests in Virginia's Coastal Plain. Submitted on 5/13/22 to: *Forest Science*.

COMPLETED GRADUATE STUDENTS (30 total – 7 PhD, 23 MF/MS)

- Garren, Austin M. May 2022. Evaluating energywood harvesting operations in the Lower Mid-Atlantic region of the United States. PhD Dissertation, Virginia Tech.
- Hawks, Brent S. May 2022. Potential effects of forestry best management practices and implementation rates on soil and water resources in the Southeastern United States. PhD Dissertation, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Hawks, Eric M. December 2021. Best management practices, erosion, residual woody biomass, and soil disturbances within biomass and conventional clearcut harvests in Virginia's Coastal Plain. MF Paper, Virginia Tech.
- Cook, Emily B. May 2021. Assessing the characteristics and supporting factors that lead to logging machine value loss. MF Paper, Virginia Tech.
- Fielding, Jonah A.H. May 2020. Estimated erosion rates by forest operation and physiographic region in the southeastern United States. MF Paper, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Hawks, Brent S. May 2019. Four-year effects of high levels of forestry best management practices on observed stream sediments and streamside management zone blow-throughs. MF Paper, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Garren, Austin M. May 2019. Soil disturbance effects from tethered forwarding on steep slopes in Brazilian Eucalyptus plantations. MF Paper, Virginia Tech.

- Dangle, Chandler L. April 2018. Efficacy of operational stream crossing best management practices on truck roads and skid trails in the Mountains, Piedmont, and Coastal Plain of Virginia. MS Thesis, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Neaves, Charlie M. April 2017. Long term effects of wet weather harvesting and site preparation on soil properties and loblolly pine (*Pinus taeda* L.) productivity in the lower Atlantic coastal plain. MS Thesis, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Lang, Albert J. May 2016. Sediment delivery from forest haul roads at stream crossings as influenced by road attributes. PhD Dissertation, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Cristan, Richie R. April 2016. Effectiveness of state developed and implemented forestry best management practices in the United States. PhD Dissertation, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Parkhurst, Brian M. November 2015. Soil response to skidder and dozer traffic as indicated by soil stress residuals. MF Paper, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Morris, Brian C. May 2015. Effectiveness, cost, and implications of forest haul road stream crossing structures and best management practices in Virginia. PhD Dissertation, Virginia Tech.
- Hanzelka, Nathan, C. May 2015. The prevalence and operational feasibility of utilizing pre-commercially thinned pine as a woody biomass energy source. MS Thesis, Virginia Tech. (Co-chair with Dr. Jay Sullivan)
- Saulnier, Will J. February 2015. Characteristics of Virginia's private forest landowners and their attitudes toward harvesting. MF Paper, Virginia Tech.
- Cockram, Drew G. May 2014. An analysis of unique biomass harvesting strategies in steep terrain of Virginia. MF Paper, Virginia Tech. (Co-chair with Dr. Scott Barrett)
- Lang, Albert J. November 2013. Streamside management zone failures associated with stream crossings, gullies, and harvests in the Piedmont. MF Paper, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Barrett, Scott M. June 2013. Operational adaptations and environmental implications on integrated biomass harvesting operations. PhD Dissertation, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Roberts, E. Talcott. June 2012. A ten year analysis of timber harvesting injuries in the Southeastern United States. MF Paper, Virginia Tech.
- Wear, Laura R. May 2012. Skid trail stream crossing closure techniques for protecting water quality. MS Thesis, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Groover, Miles C. December 2011. A comparison of chipper productivity, chip characteristics, and nutrient removals from two woody biomass harvesting treatments. MS Thesis, Virginia Tech.
- Chandler, Josh L. November 2011. Biomass harvesting effects on soil physical properties in the Coastal Plain of North Carolina. MF Paper, Virginia Tech.
- Conrad, Joseph L. August 2011. Anticipated impact of a vibrant wood-to-energy market on the U.S. South's wood supply chain. PhD Dissertation, Virginia Tech.
- Sawyers, B. Clay. May 2011. Effectiveness and implementation costs of overland skid trail closure techniques in the Virginia Piedmont. MF Paper, Virginia Tech. (Co-chair with Dr. Mike Aust)

- Wade, Charlie R. December 2010. Evaluation of bladed skid trail erosion BMPs and determination of erosion model accuracy and applicability. MS Thesis, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Ford, Will S. May 2010. A comprehensive literature review of the impacts of forest harvesting systems on Appalachian hardwood stands. MF Paper, Virginia Tech. (Co-chair with Dr. Mike Aust)
- Dowling, Tripp N. May 2010. An analysis of log truck turn times at harvest sites and mill facilities. MS Thesis, Virginia Tech.
- Conrad, Joseph L. May 2010. Virginia's woody biomass market: opportunities and implications. MF Paper, Virginia Tech.
- Moldenhauer, Matthew C. February 2009. Parcelization of South Carolina's private forestland: loggers' reactions to a growing threat. MFR Paper, Clemson University.
- Lucas, Aaron C. January 2008. An assessment tool for examining impacts of recreational forest trail use on stream crossings. MFR Paper, Clemson University.

CURRENT GRADUATE STUDENTS (2)

- Hannah Bays (PhD): Biomass BMPs, *expected May 2025*
- Carley Knight (MFR): Improving supply chain efficiency by evaluating forest transportation obstacles and innovative solutions in the Southeastern US, *expected May 2023*

CURRENT POSITIONS HELD BY FORMER GRADUATE STUDENTS

- Barrett, Scott M. (PhD) - Associate Professor of Forest Operations and Extension Specialist, Virginia Tech, Blacksburg, VA
- Chandler, Josh L. (MF) - Plant Manager, Speyside Bourbon Cooperage, Inc., Atkins, VA
- Cockram, Drew G. (MF) - Procurement Forester, WestRock Company, West Point, VA
- Conrad, Joseph L. (MF & PhD) - Associate Professor of Forest Operations, University of Georgia, Athens, GA
- Cook, Emily B. (MF) - Timber Strike Team Member, USDA Forest Service, Lexington, VA
- Cristan, Richie R. (PhD) - Assistant Professor of Forest Operations and Extension Specialist, Auburn University, Auburn, AL
- Dangle, Chandler L. (MS) - Environmental Scientist, Tetra Tech, Aiken, SC
- Dowling, Tripp N. (MS) - Assistant Wood Purchasing Manager, EGGER Group North America, Linwood, NC
- Fielding, Jonah A.H. (MF) - Area Forester, Virginia Department of Forestry, Charlottesville, VA
- Ford, Will S. (MF) - Integrated Training Area Management (ITAM) Coordinator, Virginia Department of Military Affairs, Ft. Pickett, VA
- Garren, Austin M. (MF & PhD) - Assistant Professor of Forestry, Black Hills State University, Spearfish, SD.
- Groover, Miles C. (MS) - Forester, Weyerhaeuser, Athens, GA
- Hanzelka, Nathan C. (MS) - Forest Carbon Analyst, Finite Carbon, Portland, OR
- Hawks, Brent S. (MF & PhD) - Forest Hydrologist, Weyerhaeuser, New Bern, NC
- Hawks, Eric M. (MF) - Procurement Forester, Georgia Pacific, LLC, Milledgeville, GA
- Lang, Albert J. (MF & PhD) - Watershed and Conservation Staff Forester, North Carolina Forest Service, Raleigh, NC

- Lucas, Aaron C. (MFR) - Regional Sales Manager, McGuire Loading Docks, Greenville, SC
- Moldenhauer, Matthew C. (MFR) - Land Resource Manager, Charleston County Parks and Recreation, Charleston, SC
- Morris, Brian C. (PhD) - Webster Forest Nursery Manager, Washington Department of Natural Resources, Yacolt, WA
- Neaves, Charlie M. (MS) - Environmental Scientist, Wildlands Engineering, Raleigh, NC
- Roberts, E. Talcott (MF) - Forest Operations Research Technician, Department of Forest Resources and Environmental Conservation, Virginia Tech, Blacksburg, VA
- Sawyers, B. Clay (MF) - Forestry Research Manager, Reynolds Homestead Forest Resources Research Center, Critz, VA
- Wade, Charlie R. (MS) - Software Developer, RCX, Roanoke, VA

PAPERS PRESENTED AT PROFESSIONAL MEETINGS (46)

LAST FIVE YEARS -

- Garren, A.M.*, **M.C. Bolding**, W.M. Aust, and S.M. Barrett. 2019. Soil disturbance effects from tethered forwarding on steep slopes in Brazilian Eucalyptus plantations. Poster presented at the 20th Biennial Southern Silvicultural Research Conference; Shreveport, LA. March 12-14, 2019.
- Hawks, B.S.*, C.L. Quistorff*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, and A.J. Lang. 2019. Forestry best management practices and estimated erosion rates for roads, skid trails, and stream crossings in mountainous terrain. Presented at the 20th Biennial Southern Silvicultural Research Conference; Shreveport, LA. March 12-14, 2019.
- Neaves, C.M.*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, and C.M. Trettin. 2018. Impacts of timber harvest soil disturbance and site preparation on soil properties and site productivity: literature review. In: Kirschman, Julia E., comp. Proceedings of the 19th Biennial Southern Silvicultural Research Conference. e-Gen. Tech. Rep. SRS-234. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 244-250.
- Dangle, C.L.*, W.M. Aust, **M.C. Bolding**, and S.M. Barrett. 2017. Quantifying the effectiveness of stream crossing best management practices in the Coastal Plain of Virginia. Poster presented at the Bottomland and Swamp Forests Symposium; Wilmington, NC. October 31 - November 2, 2017.
- Vinson, J.A., S.M. Barrett, W. Saulnier*, S. Prisley, **M.C. Bolding**, and J. Coulston. 2017. Woody biomass production from commercial timber harvests in Virginia. Poster presented at the 40th Annual Council on Forest Engineering Meeting; Bangor, ME. July 30 - August 2, 2017.
- Parkhurst, B.M.*, W.M. Aust, **M.C. Bolding**, and S.M. Barrett. 2017. Ridge and valley harvesting effects on soil properties, potential erosion, and sediment delivery ratios. Presented at the 19th Biennial Southern Silvicultural Research Conference; Blacksburg, VA. March 13-16, 2017.
- Dangle, C.L.*, W.M. Aust, **M.C. Bolding**, and S.M. Barrett. 2017. Cost analysis and effectiveness assessment of best management practices for stream crossings among physiographic regions of Virginia. Presented at the 19th Biennial Southern Silvicultural Research Conference; Blacksburg, VA. March 13-16, 2017.

PUBLISHED ABSTRACTS (WITH PRESENTATIONS) (30)

LAST FIVE YEARS -

- Garren, A.M.*, **M.C. Bolding**, W.M. Aust, S.M. Barrett, and T.A. Coates. 2021. Evaluating the productivity and costs of five energywood harvesting operations in the lower mid-atlantic region of the U.S. In: Proc. 53rd Annual International Symposium on Forest Mechanization (FORMEC) and joint 43rd Annual Council on Forest Engineering Meeting (COFE); Virtual meeting hosted by Oregon State University; Corvallis, OR. September 27-30, 2021. In-person presentation given at Auburn University, Auburn, AL. August 3, 2021.
- Hawks, B.S.*, **M.C. Bolding**, W.M. Aust, S.M. Barrett, and J.A.H. Fielding. 2021. Forestry best management practice implementation and erosion rates by state and regulatory approach in the southeastern U.S. In: Proc. 53rd Annual International Symposium on Forest Mechanization (FORMEC) and joint 43rd Annual Council on Forest Engineering Meeting (COFE); Virtual meeting hosted by Oregon State University; Corvallis, OR. September 27-30, 2021. In-person presentation given at Auburn University, Auburn, AL. August 3, 2021.
- **Bolding, M.C.** 2019. Conducting sustainable forest operations while minimizing environmental impacts: a compilation of research. *Keynote Presentation*. In: Proc. 52nd Annual International Symposium on Forest Mechanization (FORMEC) and joint 42nd Annual Council on Forest Engineering Meeting (COFE); Sopron, Hungary & Forchtenstein, Austria. October 6-9, 2019.
- Garren, A.M.*, **M.C. Bolding**, W.M. Aust, A.C. Moura, and S.M. Barrett. 2019. Soil disturbance from tethered forwarding on steep slopes in Brazil. In: Proc. 52nd Annual International Symposium on Forest Mechanization (FORMEC) and joint 42nd Annual Council on Forest Engineering Meeting (COFE); Sopron, Hungary & Forchtenstein, Austria. October 6-9, 2019.
- Cole, N.*, S.M. Barrett, **M.C. Bolding**, and W.M. Aust. 2018. An analysis of log hauling vehicle crashes and comparison by geographic regions in the United States in years 2011-2015. In: Proc. 41st Annual Council on Forest Engineering Meeting; Williamsburg, VA. July 18, 2018.
- Howell, R.*, W.M. Aust, and **M.C. Bolding**. 2018. Forestry best management practices used on planned and logger-selected skid trails in the Virginia ridge and valley. In: Proc. 41st Annual Council on Forest Engineering Meeting; Williamsburg, VA. July 18, 2018.
- Dangle, C.*, **M.C. Bolding**, W.M. Aust, and S.M. Barrett. 2018. BMP effectiveness at operational stream crossings on truck roads and skid trails in Virginia. In: Proc. 41st Annual Council on Forest Engineering Meeting; Williamsburg, VA. July 18, 2018.
- Warrington, B.M.*, W.M. Aust, S.M. Barrett, C.A. Dolloff, W.M. Ford, E.B. Schilling, T.B. Wigley, and **M.C. Bolding**. 2018. Forestry best management practices relationships with aquatic and riparian fauna – a review. Presented at the 2018 National Council for Air and Stream Improvement Southern Region Meeting; Atlanta, GA. June 5, 2018.
- Dangle, C.*, **M.C. Bolding**, W.M. Aust, and S.M. Barrett. 2017. Operational stream crossing BMPs in three regions of Virginia. In: Proc. 40th Annual Council on Forest Engineering Meeting; Bangor, ME. August 2, 2017.
- Cole, N.*, S.M. Barrett, **M.C. Bolding**, and W.M. Aust. 2017. Log truck accidents in the United States. In: Proc. 40th Annual Council on Forest Engineering Meeting; Bangor, ME. August 2, 2017.

INVITED ORAL PRESENTATIONS AND LECTURES (52)

LAST FIVE YEARS -

- **Bolding, M.C.** and E.B. Cook*. 2022. Logging machine value loss trends and supporting factors in the southeastern United States. Presentation given at the Southern Region Council on Forest Engineering Meeting in Clemson, SC. April 28, 2022.
- **Hawks, B.S.***, M.C. Bolding, W.M. Aust, S.M. Barrett, E.B. Schilling, and S.P. Prisley. 2022. Annual clearcut area and sediment delivery estimates for three regions in the southeastern United States. Presentation given at the Southern Region Council on Forest Engineering Meeting in Clemson, SC. April 28, 2022.
- Hawks, B.S.*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, E.B. Schilling, S.P. Prisley, J.A.H. Fielding*, and C.N. Horton*. 2022. Potential effects of forestry best management practices and implementation rates on soil and water resources in the southeastern United States. Invited presentation given at the Southern Group of State Foresters Water Resources Committee Winter Meeting in Austin, TX. March 3, 2022.
- Hawks, B.S.*, W.M. Aust, **M.C. Bolding**, S.M. Barrett, E.B. Schilling, J.A.H. Fielding*, and C.N. Horton*. 2021. Erosion and sediment mitigation by streamside management zones and harvest areas in Southeastern forests. Invited presentation given at the National Council for Air and Stream Improvement Annual Meeting (Virtual). September 16, 2021.
- **Bolding, M.C.** 2021. Forest fiber supply and procurement operations. Presented to the University of Montana FORS 341 Timber Harvesting and Roads class. February 24, 2021.
- **Bolding, M.C.** 2021. Introduction to forest operations and harvesting. Presented to the Virginia Tech FREC 2414 Field Experience in Forest Resources class. February 9, 2021.
- **Bolding, M.C.** 2020. Graduate mentoring and advising. Guest panelist along with Dr. Kevin McGuire for the Virginia Tech FREC 5014 Research Ethics and Integrity class. September 2, 2020.
- **Bolding, M.C.**, W.M. Aust, and S.M. Barrett. 2020. Harvest characteristics, estimated erosion, and BMP implementation across the southeastern US. Invited presentation given at the Sustainable Forestry Initiative Conservation Impact Sounding Board E-Workshop. June 23, 2020. 95 participants.
- **Bolding, M.C.** and R.W. Farrell. 2019. Examining the relationship between forestry best management practices and estimated erosion/sedimentations across the southeastern US. Invited joint presentation with the Virginia State Forester (Rob Farrell) at the Sustainable Forestry Initiative Annual Conference in Richmond, Virginia. October 24, 2019.
- Quistorff, C.L.* and **M.C. Bolding**. 2019. Examining the relationship of forestry best management practices and estimated erosion rates across four physiographic regions. Invited presentation given at the Sustainable Forestry Initiative Sounding Board Meeting in Washington, D.C. April 9, 2019.
- **Bolding, M.C.** 2018. Assessing soil disturbance from tethered logging systems on slopes over 50% in Brazil. Invited presentation given to Fibria Cellulose, Inc. in Jacareí, São Paulo, Brazil. January 22, 2018.
- **Bolding, M.C.** 2017. Forest operations research at Virginia Tech. Invited presentation given to Fibria Cellulose, Inc. in Jacareí, São Paulo, Brazil. June 19, 2017.

SPONSORED RESEARCH AND OTHER GRANT AWARDS

PI Portion: \$1,783,828
Total Sponsored Funding: \$14,221,158

PIs	Title	Source	PI %	Dates	PI:\$
					Total:\$
R. Bergman D. Bhattacharyya C. Bolding (Co-PI and leadership team member) T. Brown E. Brzostek R. Burns D. Ciolkosz Z. Freedman S. Grushecky D. Hartley J. Hu J. Hubbard M. Langholtz J. Leahy B. Li X. Li J. Liu L. McDonald D. McGill J. Schuler J. Skousen E. Thomchick T. Volk J. Wang (PI) S. Wurzbacher	Mid-Atlantic Sustainable Biomass for Value-added Products Consortium (MASBio)	USDA National Institute of Food and Agriculture, Sustainable Agricultural Systems	3.75	2020-2025	PI:\$375,000 Tot:\$10,000,000
D. Carter A. Coates C. Bolding	Landscape level restoration of shortleaf pine/oak stands in the Appalachian region	USDA Forest Service	18	2020-2025	PI:\$50,000 Tot:\$274,508
J. Wang C. Bolding T. Gallagher A. Kizha D. Hartley	Advancing Forest Logging Residue Harvesting and Collection Logistics in the Eastern U.S.	USDA National Institute of Food and Agriculture	20	2019-2022	PI:\$200,000 Tot:\$1,000,000
C. Bolding M. Aust S. Barrett	Monitoring and Quantifying the Effects of State Forestry BMP	National Council for Air and	34	2018-2021	PI:\$51,000

	Programs on Soil Erosion and Sediment Delivery for the Southeastern United States: Module I	Stream Improvement			Tot:\$150,000
C. Bolding M. Aust S. Barrett	Monitoring and Quantifying the Effects of State Forestry BMP Programs on Soil Erosion and Sediment Delivery for the Southeastern United States: Module III	Sustainable Forestry Initiative Conservation Grant Program	34	2018-2021	PI:\$40,800
					Tot:\$120,000
M. Aust C. Bolding S. Barrett K. McGuire	Potential Sediment Control and Costs of Enhanced BMPs at Operational Stream Crossings	National Council for Air and Stream Improvement	25	2016-2019	PI:\$40,750
					Tot:\$163,000
M. Aust S. Barrett C. Bolding D. McLaughlin	Silvicultural Systems, Haul Roads, and Skid Trail Effects in Appalachian Hardwood Watersheds	National Council for Air and Stream Improvement	25	2015-2017	PI:\$5,025
					Tot:\$20,100
M. Aust C. Bolding S. Barrett	Twenty Five Year Remeasurement of Primary Skid Trails and Nontrafficked Lower Coastal Plain Soils Originally Ameliorated with Mechanical Site Preparation	National Council for Air and Stream Improvement	33	2015-2017	PI:\$31,099
					Tot:\$94,238
M. Aust C. Bolding S. Barrett	Assessing Machine Pressures and Resulting Soil Responses During Forest Operations	USDA Forest Service	33	2014-2017	PI:\$9,900
					Tot:\$30,000
S. Prisley C. Bolding J. Conrad M. Vokoun	Wisconsin Wood Supply Assessment	Wisconsin Department of Natural Resources through the National Council for Air & Stream Improvement	25	2014-2015	PI:\$24,987
					Tot:\$99,947

M. Aust C. Bolding S. Barrett K. McGuire	Examination of Existing Forest Stream Crossings in Order to Quantify the Potential Sediment Reduction and Calculate Costs of Different Levels of BMPs	National Council for Air and Stream Improvement	25	2014	PI:\$5,500
					Tot:\$22,000
E. Wiseman C. Bolding J. Munsell	Baseline Data on Urban Waste Wood Generation and Utilization by Municipalities and Commercial Arborists in Virginia	VA Dept. of Forestry	10	2013-2014	PI:\$2,943
					Tot:\$29,434
C. Bolding	Evaluating the Willingness of Virginia's Landowners to Harvest	Center for Natural Resources Assessment and Decision Support	100	2013-2014	PI:\$44,485
					Tot:\$44,485
M. Aust C. Bolding K. McGuire	Predicting the Effectiveness of Forestry Best Management Practices for Reducing Stream Sediment Delivery in the Southeastern United States	Southern Group of State Foresters through the Virginia Department of Forestry	33	2013-2015	PI:\$29,700
					Tot:\$90,000
C. Bolding M. Aust	Forest Road and Stream Crossing BMP Research	Reynolds Homestead Endowment	50	2013-2014	PI:\$500
					Tot:\$1,000
M. Aust C. Bolding B. Strahm	Sixteen Year Effects of Wet Weather Harvesting and Site Preparation on Soil Physical Properties in the South Carolina Coastal Plain	National Council for Air & Stream Improvement	33	2013-2014	PI:\$18,771
					Tot:\$56,883
M. Aust C. Bolding C. Dolloff M. Ford	Forest Operations and Associated Forestry Best Management Practices Effects on Stream and Riparian Biota: An Analysis of Existing Information	National Council for Air & Stream Improvement	40	2013-2014	PI:\$9,970
					Tot:\$24,926

S. Barrett M. Aust C. Bolding	Enhancing protection of Virginia's water resources by integrating forestry Best Management Practices (BMPs) research into Extension programs to improve BMP implementation and increase awareness of water quality considerations associated with biomass harvesting	Integrated Internal Competitive Grants Program, College of Agriculture and Life Sciences, Virginia Tech	25	2013-2014	PI:\$5,375
					Tot:\$21,500
M. Aust C. Bolding S. Barrett J. Munsell	National Status of State Developed and Implemented Forestry Best Management Practices	National Association of State Foresters	35	2012-2015	PI:\$34,797
					Tot:\$99,419
J. Sullivan C. Bolding S. Barrett	The Prevalence and Operational Feasibility of Utilizing Pre-Commercially Thinned Pine as a Woody Biomass Source	VA Dept. of Forestry	33	2012-2015	PI:\$10,642
					Tot:\$32,250
C. Bolding	Forest Road and Stream Crossing BMP Research	Reynolds Homestead Endowment	100	2012-2013	PI:\$850
					Tot:\$850
M. Aust C. Bolding B. Strahm	Fifteen-Year Productivity Responses of Loblolly Pine Plantations to Wet-Weather Harvesting and Site Preparation in the South Carolina Coastal Plain	National Council for Air & Stream Improvement	33	2012-2013	PI:\$2,626
					Tot:\$7,958
M. Aust C. Bolding K. McGuire	Characterization, Potential Sediment Contributions, and BMP Sediment Control for Ditched Forest Roads at Stream Crossings	National Council for Air & Stream Improvement	45	2012-2016	PI:\$118,098
					Tot:\$262,439
C. Bolding			100		PI:\$580

	Forest Road and Stream Crossing BMP Research	Reynolds Homestead Endowment		2011-2012	Tot:\$580
P. Radtke C. Bolding R. Wynne V. Thomas	Supplement to Integrating Knowledge and Data from Multiple Sources in the Southern Region: Experimental Forest; Intensive Site Monitoring; and Remote Sensing Imagery	USDA Forest Service	30	2011-2012	PI:\$18,000 Tot:\$60,000
C. Bolding M. Aust	Modeling The Effects Of Skid Trail Characteristics And Closure Techniques On Potential Soil Erosion	Appalachian Hardwood Forest Research Alliance	50	2010-2012	PI:\$12,500 Tot:\$25,000
J. Ignosh C. Bolding L. Marr T. Moore J. Munsell	Enhancing Bioenergy Product Development In Virginia: Identifying Potential Biomass Boiler Locations, Assessing Available Resources, And Streamlining Barriers For Biomass Utilization	VA Dept. of Mines, Minerals, & Energy	20	2010-2012	PI:\$15,500 Tot:\$77,500
C. Copenheaver V. Thomas C. Bolding J. Sullivan	Inclusive Excellence In Forestry Graduate Programs At Virginia Tech	USDA Food & Agri. Sciences National Needs Graduate Fellowship Grants Program	23	2011-2015	PI:\$58,995 Tot:\$256,500
M. Aust C. Bolding	Water Quality And Closure BMPs For Forest Stream Crossings	USDA Forest Service	50	2010-2012	PI:\$17,500 Tot:\$35,000
M. Aust C. Bolding	Closure BMPs For Forest Stream Crossings And Subsequent Effects On Water Quality	VA Dept. of Forestry	50	2010-2012	PI:\$9,822 Tot:\$19,644
J. Munsell C. Bolding J. Ignosh	Systems Capacity In Support Of Federal Energy Management Programs	KeyLogic Systems, Inc.	30	2010	PI:\$30,714 Tot:\$102,380

A. Zink-Sharp C. Bolding C. Copenheaver K. Edgar T. Fox C. Frazier S. Prisley S. Renneckar M. Roman S. Zedaker	SEMRR: Developing Sustainable Bioenergy Feedstocks And Cellulosic Composites	USDA NIF Special Grant Program	10	2010-2011	PI:\$45,137
					Tot:\$451,374
C. Bolding M. Aust	Assessing Skid Trail Closure BMPs On Bladed And Overland Skid Trails	Reynolds Homestead Endowment	50	2009-2010	PI:\$1,117
					Tot:\$2,234
C. Bolding R. Shaffer	A Ten Year Analysis Of Timber Harvesting Injuries In The Southeastern United States 1996-2006	THATS Foundation	100	2009-2012	PI:\$5,000
					Tot:\$5,000
C. Bolding R. Shaffer	An Analysis Of Timber Harvesting Injuries And Prevention Mechanisms In The Southeastern United States 1996-2006	SE Center for Agricultural Health & Injury Prevention (NIOSH)	100	2009-2011	PI:\$35,838
					Tot:\$35,838
C. Bolding M. Aust T. Fox	A Comprehensive Literature Review Of The Impacts Of Forest Harvesting Systems On Appalachian Hardwood Stands	Appalachian Hardwood Forest Research Alliance	100	2009	PI:\$10,000
					Tot:\$10,000
C. Bolding M. Aust	Comparing Forestry BMPs For The Control Of Water Movement And Soil Erosion On Bladed And Overland Skid Trails	National Council for Air & Stream Improvement	50	2009-2011	PI:\$42,360
					Tot:\$84,721
C. Bolding M. Aust	An Analysis Of Forestry BMPs Used To Control Water Movement And Soil Erosion On Bladed And Overland Skid Trails	VA Dept. of Forestry	50	2009-2011	PI:\$22,000
					Tot:\$44,000
C. Bolding	Development Of New Harvesting Techniques	USDA Forest Service	100	2008-2009	PI:\$18,978
					Tot:\$18,978

C. Bolding	Safe And Efficient Practices For Trucking Forest Products	THATS Foundation	100	2008-2009	PI:\$5,000
					Tot:\$5,000
Forest Operations and Business Research Cooperative Funding (\$253,500)					
C. Bolding	Improving Supply Chain Efficiency by Evaluating Forest Transportation Obstacles in the Southeastern US	John Deere Construction & Forestry Company	100	2022-2023	PI:\$55,000
					Tot:\$55,000
C. Bolding	Assessing the Characteristics and Supporting Factors that Lead to Logging Machine Value Loss	John Deere Construction & Forestry Company	100	2020-2021	PI:\$45,000
					Tot:\$45,000
C. Bolding	Forest Operations and Business Research Cooperative Funding	Hopkins Lumber Contractors	100	2018-2022	PI:\$2,500
					Tot:\$2,500
C. Bolding	Forest Operations and Business Research Cooperative Funding	Suzano Pulp and Paper, Inc.	100	2017-2018	PI:\$17,000
					Tot:\$17,000
C. Bolding M. Aust	Forest Operations and Business Research Cooperative Funding	Greif, Inc.	50	2009-2022	PI:\$22,500
					Tot:\$45,000
C. Bolding	Forest Operations and Business Research Cooperative Funding	Virginia Department of Forestry	100	2016-2021	PI:\$30,000
					Tot:\$30,000
C. Bolding	Assessing Soil Disturbance from Tethered Logging Systems on Slopes over 50% in Brazil	John Deere Construction & Forestry Company	100	2018	PI:\$30,000
					Tot:\$30,000
C. Bolding	Forest Operations and Business Research Cooperative Funding	Plum Creek Timber Company	100	2015	PI:\$5,000
					Tot:\$5,000
C. Bolding	Forest Operations and Business Research Cooperative Funding	Huber Engineered Woods, LLC	100	2011-2021	PI:\$19,000
					Tot:\$19,000
C. Bolding	An Analysis of Truck Turn Times at Both The Tract and Mill Scales	LandMark Systems	100	2009-2010	PI:\$5,000
					Tot:\$5,000
Grants Received at Clemson University (\$92,972)					
C. Bolding			100	2008	PI:\$11,106

	2008 PSA Research Vehicle Fund Program Request	CU Public Service and Agriculture			Tot:\$11,106
C. Bolding	Analysis Of Transportation Issues For Forestry And Agricultural Materials Used In Bio-Based Fuel Production	CU Public Service and Agriculture	100	2007	PI:\$37,500
					Tot:\$37,500
C. Bolding K. Cox S. Guynn	2007 Sale Area Layout And Harvesting Institute – SALHI East	USDA Forest Service	100	2007	PI:\$44,366
					Tot:\$44,366

INTERNATIONAL RESEARCH COLLABORATIONS AND ACTIVITIES

- Sweden – Skogforsk – The Forestry Research Institute of Sweden. Uppsala Science Park, Uppsala, Sweden. Invited to Skogforsk in 2016 to discuss potential bioenergy and environmental impacts research collaboration. In 2018, I hosted Dr. Lars Eliasson (Senior Researcher) and Dr. Magnus Thor (Director of Research and Innovation) on the VT campus to continue discussion of potential collaborative opportunities.
 - Invited to Sweden to serve as an Opponent for the PhD Defense of Anders Eriksson entitled: “Improving the Efficiency of Forest Fuel Supply Chains” on 10/28/16 at the Department of Energy and Technology, Swedish Agricultural University, Uppsala, Sweden. The Swedish Agricultural University funded travel expenses and stipend.
- Italy – The Italian National Research Council Trees and Timber Institute (CNR-INVALSA). Sesto Fiorentino, Italy. Invited to CNR-INVALSA in 2016 to meet with Dr. Raffaele Spinelli and Dr. Natascia Magagnotti to discuss potential steep slope harvesting and bioenergy research collaboration.
- Brazil – Suzano Pulp and Paper. São Paulo, Brazil. Suzano joined the Forest Operations and Business Research Cooperative as an Associate Member in 2017. Invited to São José Dos Campos, São Paulo, Brazil in June 2017 and January 2018 to visit operations and discuss potential collaborative opportunities. Provided presentations during each visit on the status of forest operations research at Virginia Tech. Completed collaboration with Suzano on a research project entitled: “Assessing soil disturbance from tethered logging systems on slopes over 50% in Brazil”. The project was jointly funded by Suzano and John Deere Construction and Forestry and was the graduate program of Austin Garren (MF Student).
- New Zealand – The University of Canterbury. Christchurch, New Zealand. Invited by Dr. Rien Visser to collaborate on a research project entitled: “Used forestry machine price study: a comparison of New Zealand and U.S. values and characteristics”. The project is currently underway with assistance from one University of Canterbury and three Virginia Tech graduate students and will result in the submission of a peer-reviewed journal article.
- Collaborated on a research proposal submitted to the US Department of Education entitled “International education and exchanges: natural resources, climate change, mitigation, and adaptation.” This project sought to establish an educational consortium between Virginia Tech and the University of North Carolina at Wilmington for exchange with three Brazilian universities at the Universidade de São Paulo, one of Brazil’s premier universities, with Universidade Federal do Oeste do Pará and Universidade Federal do Amazonas, both in the

heart of the Amazon, with support from the Instituto de Pesquisas e Estudos Florestais. This consortium sought to develop opportunities for students to learn about climate change mitigation and adaptation in diverse environments in the U.S. and Brazil.

- Frequent reviewer of research proposals and reports for WorkSafe BC, Research Secretariat, Workers Compensation Board of British Columbia, Canada.

PROFESSIONAL MEMBERSHIPS

- Council on Forest Engineering
- Society of American Foresters
- Virginia Forestry Association
- Xi Sigma Pi Honor Society

PROFESSIONAL RECOGNITION AND HONORS

- Virginia Tech Press Release. 2020. “\$10 million grant to foster new sustainable biomass research”. The article highlights biomass utilization research by **M.C. Bolding** funded by the USDA National Institute of Food and Agriculture. Featured in the Virginia Tech daily email on September 17, 2020, and distributed to several dozen media outlets and forestry professional associations and agencies.
https://vtnews.vt.edu/articles/2020/09/cnre-bolding-biomass-grant.html?utm_source=cmpgn_news&utm_medium=email&utm_campaign=vtUnirelNewsDailyCMP_091720-fs
- Virginia Tech Daily Video. 2019. Featured in a group of six videos entitled: “Solutions to help the environment”. The video entitled: “Becoming better stewards of the forest” highlights biomass utilization research by **M.C. Bolding** funded by the USDA Agriculture and Forestry Research Initiative. Featured in the Virginia Tech daily email on December 12, 2019. https://vtnews.vt.edu/campaign-videos/complex-environment.html?utm_source=cmpgn_news&utm_medium=email&utm_campaign=vtUnirelNewsDailyCMP_121219-fs1
- Virginia Tech Press Release. 2019. “Grant helps Virginia Tech scientists find new ways to utilize secondary logging materials”. The article highlights biomass utilization research by M.C. Bolding funded by the USDA Agriculture and Forestry Research Initiative. Featured in the Virginia Tech daily email on July 11, 2019, and distributed to several dozen media outlets and forestry professional associations and agencies.
<https://vtnews.vt.edu/articles/2019/06/cnre-forest-residues-grant.html>
- Virginia Tech Homepage *Spotlight on Innovation* Article – “Fuel for the Future”. 2013. “Forest researchers seek economical ways to use wood waste for energy”. The article highlights biomass utilization research by **M.C. Bolding** and S.M. Barrett and is one of three features from the College of Natural Resources and Environment per year. Featured on the VT website during May, June, and July, 2013.
- 2012-2013 Outstanding Faculty Award, Department of Forest Resources and Environmental Conservation, Virginia Tech
- External Graduate Faculty Member, School of Forest Resources, University of Maine, Orono, ME. 2021 – 2026.
- Adjunct Assistant Professor, Department of Forestry and Environmental Conservation, Clemson University, Clemson, SC. 2008 – 2013.

- Adjunct Assistant Professor, Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA. 2008 – 2010.

EDITORSHIPS

- **Associate Editor** and member of the editorial board of the *International Journal of Forest Engineering*, published by the Forest Products Society in association with Taylor and Francis. February 2014 – Present.
- **Associate Editor** for the areas of Harvesting, Engineering, and Utilization and member of the editorial board of *Forest Science*, published by the Society of American Foresters. January 2014 – Present.

MANUSCRIPT REVIEWER

- *Croatian Journal of Forest Engineering*
- *Forest Products Journal*
- *Forest Science*
- *International Journal of Forest Engineering*
- *Journal of Forestry*
- *Northern Journal of Applied Forestry*
- *Oregon State University Forest Research Laboratory*
- *Silva Fennica*
- *Southern Forests*
- *Southern Journal of Applied Forestry*
- *Western Journal of Applied Forestry*

SERVICE AS AN OFFICER OF A PROFESSIONAL ASSOCIATION

- 2017-2018 Co-chairman of the Council on Forest Engineering
- 2015-present Chair, Awards Committee, Council on Forest Engineering
- 2007-2008 Chair, Keowee Chapter of the Society of American Foresters
- 2007-2008 Co-chairman of the Council on Forest Engineering
- 2007-2008 South Carolina Division of the Society of American Foresters Science and Technology Chair
- 2006-2007 Chair-Elect, Keowee Chapter of the Society of American Foresters

CONFERENCES AND WORKSHOPS HOSTED AND COORDINATED (4)

- 41st Annual Council on Forest Engineering Meeting. Hosted and co-chaired with Dr. Scott Barrett. Jointly edited the peer-reviewed proceedings (10 papers) into a special issue of the *International Journal of Forest Engineering* entitled “Forest Engineering Innovations and Advancements”. The conference was held in Colonial Williamsburg, VA July 15-18, 2018 with the theme “Revolutionary Traditions, Innovative Industries”. Meeting attendance was 68 representing 7 countries (Brazil, Canada, Italy, New Zealand, South Africa, Sweden, and U.S.) and 21 U.S. states covering three full days with 53 presentations and a full day industrial field trip hosted by Enviva Biomass. Secured sponsorship of \$13,500 from Enviva Biomass, Suzano Pulp and Paper, Huber Engineered Woods, Council on Forest Engineering, John Deere, Virginia Tech Department of Forest Resources and Environmental Conservation, and IUFRO to support the meeting. Sixteen students were in attendance representing Laval University –

Canada, Auburn University, Virginia Tech, University of Georgia, Northern Arizona University, University of Montana, West Virginia University, and University of Stellenbosch – South Africa.

- Symposium on Forestry Best Management Practice Effectiveness in the Eastern US. Co-sponsored by the National Council for Air and Stream Improvement, Inc. (NCASI), the Society of American Foresters, and Virginia Tech. The conference was held at the Inn at Virginia Tech and Skelton Conference Center May 12-15, 2014. Meeting attendance was approximately 125 with 40 invited and volunteered technical presentations. A full day field trip was coordinated and hosted at the Reynolds Homestead Forest Resources Research Center in Critz, VA.
- 31st Annual Council on Forest Engineering Meeting. Co-hosted and edited the proceedings of this meeting with Dr. Dale Greene at the University of Georgia. The conference was held in Charleston, SC June 22-25, 2008. Meeting attendance was approximately 80 representing 8 countries with 36 paper presentations and 10 poster presentations.
- 2007 Sale Area Layout and Harvesting Institute (SALHI-East). Organized and hosted 3-weeks of this 5-week training for 30 USDA Forest Service employees. Funding secured: \$44,366.

EFFORTS TO PROMOTE DIVERSITY

- Co-PI on a 5-year research grant secured from the USDA Food and Agricultural Sciences National Needs Graduate Fellowship Program entitled “Inclusive excellence in forestry graduate programs at Virginia Tech” that funded 4 graduate student assistantships (2 MS and 2 PhD). These students were citizens of the United States and either first generation college students (neither parent has a college degree), women, or minorities. The students conducted research in the areas of climate change, water, and biomass/bioenergy and were housed in the Department of Forest Resources and Environmental Conservation.
- Faculty Scholar, Inclusive Excellence at Virginia Tech (2019-2021) – one of a three-member Department of Forest Resources and Environmental Conservation faculty cohort. The purpose of the program, funded by the Howard Hughes Medical Institute, is to implement, assess, and improve the learning environments for students from underrepresented groups at Virginia Tech.
- Spring 2020 and 2021. Organized and lead a reading group with other Howard Hughes Medical Institute Inclusive Pedagogy faculty and student scholars to discuss diversity and inclusion in higher education.

RECOGNITION AND AWARDS FOR OUTREACH AND EXTENSION EFFECTIVENESS

- Forest Resources Association Appalachian Region 2014 Technical Writing Award 1st Place (Plaque and \$100). Technical Release 14-R-11, “Skid Trail Stabilization Research and Logger Training”. Authors: **M.C. Bolding**, W.M. Aust, and S.M. Barrett.
- Southern Regional Extension Forestry 2013 Awards for Excellence - Bronze Award for Extension Publication. “Forest Harvesting in Virginia: Characteristics of Virginia’s Logging Operations”. Authors: S.M. Barrett, J. Chandler, **M.C. Bolding**, and J.F. Munsell.
- Southern Regional Extension Forestry 2011 Awards for Excellence - Silver Award for National/International Project. “Wood Bioenergy Assessments in Support of Department of Energy’s Federal Energy Management Program”. Authors: J.F. Munsell, J.P. Ignosh, and **M.C. Bolding**.

- Southern Regional Extension Forestry 2011 Awards for Excellence - Gold Award for Journal Publication. “Virginia SHARP Logger Survey: Characteristics of Virginia’s Logging Businesses”. Authors: S.M. Barrett*, **M.C. Bolding**, and J.F. Munsell.
- Forest Resources Association Appalachian Region 2010 Technical Writing Award 2nd Place (Plaque and \$50). Technical Release 09-R-30, “Trucking Safety/Efficiency Manual as Continuing Ed Resource”. Authors: **M.C. Bolding**, T.N. Dowling*, and S.M. Barrett*.
- Forest Resources Association Appalachian Region 2010 Technical Writing Award 3rd Place (Plaque and \$25). Technical Release 10-R-11, “Loggers’ Willingness to Adapt to Biomass Harvesting”. Authors: S.M. Barrett*, **M.C. Bolding**, and J.F. Munsell.

UNIVERSITY SERVICE

- University Promotion and Tenure Committee (College of Natural Resources and Environment Representative), *Service*: 2021-present
 - Responsible for university-wide deliberation and voting on promotion and tenure candidates and non-voting member participation in college-level deliberations
- Virginia Tech Faculty Review Committee (College of Natural Resources and Environment Representative), *Service*: 2021-2024
- Peer Reviewer, Virginia Tech Office of Institutional Effectiveness Academic Program Review of the Department of Sustainable Biomaterials, *Service*: Spring 2021
- Virginia Tech Pathways General Education Curriculum Review Committee (College of Natural Resources and Environment Representative), *Service*: 9/1/2020 – 5/10/2021
- Virginia Tech University Council (College of Natural Resources and Environment Representative), *Service*: 2020
- Virginia Tech Pathways Ad Hoc Review Committee (College of Natural Resources and Environment Representative), *Service*: 10/1/2019 – 5/10/2020
- Virginia Tech University Libraries’ Dean’s (Tyler Walters) Advisory Committee, *Service*: 2014-present
- Virginia Tech Commission on Graduate and Professional Studies and Policies (CGPSP) (College of Natural Resources and Environment Representative), *Service*: Spring 2021, 2012-2015
 - Member, Degree Requirements, Standards, Criteria, and Academic Progress (DRSCAP) CGS&P Sub-committee; 2012-2013
 - Member, Graduate Honor System Appeal CGS&P Sub-committee (Three appeals heard; 11/12/12, 11/29/12, 09/18/13)
- Virginia Tech Graduate Curriculum Committee (College of Natural Resources and Environment Representative), *Service*: 2012
- Virginia Tech Academic Support Committee (College of Natural Resources and Environment Representative), *Service*: 2009-2012; 2018-2022
- Assistant Commencement Marshall, Virginia Tech Undergraduate Ceremony, *Service*: Spring 2009

COLLEGE SERVICE

- CNRE Young Alumni Award Selection Committee, *Service*: Spring 2021
- CNRE Student Policy and Affairs Committee, *Service*: 2015-2016

DEPARTMENTAL SERVICE

- Chair, Department Head Comprehensive 5-year Review Committee, Fall 2021
 - Chosen by the CNRE Dean to conduct a review of the role and responsibilities of the FREC Department Head and how he carries out his duties and leads the department. The review required the construction of a diverse faculty and staff review committee, development and implementation of a survey instrument as well as faculty, staff, and outside stakeholder input meetings with the committee. The review was developmental, as well as summative and culminated in a report to the Dean designed to help both the administrator and the department develop and improve.
- Peer Evaluation of Teaching
 - Fall 2020 - FREC 2514 Wildland Fire: Ecology and Management taught by Dr. Adam Coates. Evaluation was conducted jointly with Dr. Mike Aust.
 - Spring 2018 - FREC 4444 Integrated Forest Management Practicum taught by Dr. Scott Barrett. Evaluation was conducted jointly with Dr. Mike Aust.
- FREC Departmental Lab Planning Liaison, Summer & Fall 2020
 - Served as faculty representative liaison to the Provost's office for planning Fall 2020 laboratory instruction procedures
- FREC Facilities Committee, *Service*: 2015-2017, 2020-2022
- FREC Undergraduate Affairs Committee, *Service*: 2014-2016
- FREC Graduate Affairs Committee, *Service*: 2010-2011 (Chair); 2011-2012
- FREC Budget and Planning Committee, *Service*: 2009-2011; 2013-2014; 2014-2015 (Chair); 2019-2021
- FREC Ad Hoc Field Skills Course Development Committee, *Service*: 2009
- Supervise (100%) and complete performance evaluations and outcomes for one full-time research technician in the Department of Forest Resources and Environmental Conservation (09/01/14 - present)
- Co-supervise (50%) one full-time research technician in the Department of Forest Resources and Environmental Conservation (08/10/08 - 08/31/14)

COURSE REVISION AND CURRICULUM CHANGES

- I worked with other faculty to revise the Forestry BS option of Industrial Forestry Operations into a new option named Forest Operations and Business. The name change and new focus on business has allowed us to attract more students and become more relevant to our stakeholders.
- I served on a departmental Ad Hoc committee who was charged with developing a new field skills course and tour to replace the past Spring Camp course structure. The work of this committee was one of the most significant curriculum changes in the program's history.

FREC 3344 Forest Field Studies

- This course was restructured into a 5-day field course including a combination of field exercises and tour/discussion of forest operations throughout the Piedmont and Coastal Plain of Virginia.

FREC 3734 Timber Procurement

- This course was re-organized to include 7-8 guest speakers representing a variety of forest industry approaches to wood procurement. The course also utilizes two full-day field trips that culminate in an inventory and case study evaluation of a timber tract for sale. Students work

in groups to inventory, analyze, and prepare mock bids that are compared against the actual timber sale value provided by a cooperating procurement forester.

FREC 4714 Harvesting Systems Evaluation

- After not being offered for several years, I reorganized the course to focus on advanced harvesting systems, environmental impacts, business decisions, and engineering economic analysis. Two full-day field trips were added to give students more exposure to harvesting systems and analysis techniques throughout Virginia. These trips are used to perform detailed harvesting productivity and cost studies on representative operations in both the Mountain and Piedmont regions. Students then prepare and present final group reports to the class in both written and oral formats.

FREC 5714G Advanced Harvesting Systems Evaluation

- I completed the process of adding a graduate conjoint counterpart to FREC 4714 Harvesting Systems Evaluation which is named FREC 5714G Advanced Harvesting Systems Evaluation. The course was taught for the first time in Spring 2010 and allows me to offer advanced forest operations instruction to graduate students.

FREC 3734 Forest Fiber Supply

- This course was developed (Spring 2020) by combining FREC 3734 Timber Procurement (2-hrs) and FREC 3344 Forest Field studies (1-hr) into a new 3 credit hour course. The course was also submitted and approved by the Pathways general education program as an advanced discourse class. This allows FREC students the opportunity to complete both disciplinary and general education degree requirements by taking the course.

FREC/NR: 4004 Professional Skills in Natural Resources

- This course (1-hr) was developed (Fall 2020) as a result of participating in the Howard Hughes Medical Institute Inclusive Excellence Grant. Along with colleagues Dr. John Seiler and Dr. Adam Coates the course was developed to improve the professional skills of seniors in the fall semester of their final year. Guest speakers from academics, industry, and government provide instruction on elements of professionalism and principles of success across a wide spectrum of natural resources careers. The course covers skills for effective and ethical professional interaction including written and oral communication, advancement of diversity and inclusion, and personal responsibility. Career preparation principles including employer outreach, job seeking, resume writing, and interview preparation are taught.