

J. M. Budke, Ph.D.
University of Tennessee – Knoxville

Ecology and Evolutionary Biology Department, 569 Dabney Hall, Knoxville, TN 37996 USA

TENN Herbarium, Temple Hall, 1818 Andy Holt Blvd, Knoxville, TN 37996-2800 USA

Email: jbudke@utk.edu - Phone: (865) 974-6204

<http://jmbudke.github.io/> - <https://orcid.org/0000-0003-1149-1522>

FIELDS OF EXPERTISE

Evolutionary Developmental Biology, Structure-Function Relationships, Parent-Offspring Conflict, Systematics, Taxonomy, Natural History Collections, Botany, Bryology (mosses), Science Communication.

ACADEMIC APPOINTMENTS

August 2022 - Present: **Associate Professor & Herbarium Director**, Univ. of Tennessee, Knoxville, TN

August 2016 - July 2022: **Assistant Professor & Herbarium Director**, Univ. of Tennessee, Knoxville, TN

June - July 2016: **Research Assistant Professor**, University of Tennessee, Knoxville, TN

POSTDOCTORAL EXPERIENCE

2013 - 2016: **Katherine Esau Postdoctoral Research Fellow**, University of California - Davis

2011 - 2012: **Postdoctoral Researcher**, University of Connecticut, Storrs, CT

EDUCATION

2011 **Ph.D. Ecology and Evolutionary Biology**, University of Connecticut, Storrs, CT

2005 **M.S. Botany**, University of Connecticut, Storrs, CT

2003 **B.S. Botany**, Miami University, Oxford, OH

PUBLICATIONS (¹co-first authors, *undergraduate student collaborator, **graduate student collaborator)

In Preparation

Noroozizarmehri M, **Budke JM**. Gametophyte and sporophyte morphology is phylogenetically correlated in moss species with separate sexes, indicating a higher level of parent-offspring conflict. In review at *New Phytologist*.

Patel NR, **Budke JM**, Bainard JD. Chromosome number and genome size evolution across the bryophyte phylogeny. Accepted pending minor revisions at *Annals of Botany*.

Bendull H*, Lewis RA, **Budke JM**. The State of Herbarium Backlogs: Perspectives from Bryophyte Collections. Submission planned to *The Bryologist*.

Butler J**, **Budke JM**. Aquatic transitions and interspecific relationships in *Fissidens* mosses. Submission planned to *American Journal of Botany*.

Peer Reviewed (33)

2024 Okafor AN*, **Budke JM**. Mosses with shorter sporophytes allocate more conducting cell area to leptoids. *Evansia* 41: 67–71. (Featured on the cover: Volume 41, Issue 3)

2024 **Budke JM**. Illuminating the role of the calyptra in sporophyte development. *Current Opinion in Plant Biology* 81: 102565.

2024 Shershen E**, Stehn S, **Budke JM**. Environmental determinants of bryophyte community change over time. *Ecosphere* 15: e4924.

- 2024 von Konrat M, Rodriguez Y, Bailey C, Gwilliam III GF, Christian C, Aguero B, Ahn J, Albion Z, Allen JR, Bailey C, Blake E, Blake W, Blake G, Briscoe L, **Budke JM**, Campbell T, Chansler T, Clark D, Delapena R, Denslow M, Ellis S, Ellwood E, Ens B, Evans NM, Fabian A, Gaswick W, Golembiewski K, Grant S, Hansen K, Janney B, Janeen Jones, Kachian Z, Kawasaki L, Leek O, Kellum K, Maier C, Mast A, Martinec JL, Mayer P, Mladek M, Nadhifah A, Neefus C, Nodulman M, Oliver M, Overberg K, Peterson AT, Qazi-Lampert A, Rothfels C, Salm R, Schreiner D, Schreiner M, Tepe EJ, Turcatel M, Vega A, Wade H, Weinand D, Webbink K, Widhelm T, Zwingelberg M. From Spectators to Stewards: Transforming Public Involvement in Natural History Collections. *Natural History Collections and Museomics* 1: 1–33.
- 2024 Ellis LT, Adjie B., Alvarez DJ, Ardiles V, Asthana AK, Atwood JJ, Bakalin VA, Bednarek-Ochyra H, Boiko M, **Budke JM**, Cedrés-Perdomo RD, Cerrato MD, Csiky J, Espinoza-Prieto B, Gabriel R, Gey S, Gil L, Graulich, Hylander K, Kiebacher, Konstantinova NA, Kučera J, Kunev G, Larraín J, Lönnell N, Maciel-Silva AS, Mamontov YuS, Mattos GHR, Mir-Rosselló PM, Nadhifah A**, Natcheva R, O’Leary SV, Oliveira MF, Opisso J, Papp B, Peñalosa-Bojacá GF, Polaino-Martín C, Rawat KK, Ribas-Serra A, Rosadziński S, Sahu V, Sipos A, Staniaszek-Kik M, Starzomski BM, Suárez GM, Tucker DBL, Verma A, Zagrodniuk N. New national and regional bryophyte records. *Journal of Bryology* 77: 1–17.
- 2023 Faidiga A**, Oliver MG, **Budke JM**, Kalisz S. Shifts in flowering phenology in response to spring temperatures in eastern Tennessee. *American Journal of Botany* 110: e16203.
- 2023 **Budke JM**¹, Patel NR¹, GoFlag Consortium, Wienhold MD, Bruggeman-Nannenga MA. Exploring systematic relationships and morphological evolution in the moss genus *Fissidens* using molecular data generated from herbarium specimens. *Journal of Systematics and Evolution* 61: 868-889.
- 2022 Lewis RA, **Budke JM**. Bryophyte specimen organization and storage systems: A comparative assessment of staff practices and user preferences. *The Bryologist* 125: 222-247.
- 2022 Harrison GR**, Boggess LM, **Budke JM**, Madritch MD. Rock-climbing shifts cliff-face vegetation community composition based on site characteristics. *Applied Vegetation Science* 25(2): e12667.
- 2022 Oliver MG, Crabtree T, McFarland KD, **Budke JM**. Noteworthy Collections: First documented antheridia on *Palamocladium leskeoides* (Brachytheciaceae) in North America. *Castanea* 87: 75-80.
- 2021 Whitaker KR*, **Budke JM**. Moss sporophyte transpiration rates are higher when calyptrae are removed. *Evansia* 38: 100-108.
- 2020 Benoit AD**, Oliver MG, Vichich RJ*, **Budke JM**. Noteworthy Collections: First record of the non-native plant *Portulaca amilis* (Portulacaceae) in Tennessee. *Castanea* 85: 343-347.
- 2020 Bainard JD, Newmaster SG, **Budke JM**. Genome size and endopolyploidy evolution across the moss phylogeny. *Annals of Botany* 125: 543-555. (Editor’s Choice – Bryophyte Highlight)
- 2019 **Budke JM**. The moss calyptra: A maternal structure influencing offspring development. *The Bryologist* 122: 471-491. (Featured on the cover: Volume 122, Issue 3.)
- 2019 Patel NR, Fawcett S, Sundue MA, **Budke JM**. Evolution of Perine Morphology in Thelypteridaceae. *International Journal of Plant Sciences* 180: 1016-1035.
- 2018 Miller CN**, Brabazon H, Ware IM**, Kingsley NH*, **Budke JM**. Bringing an historic collection into the modern era: curating the J. K. Underwood seed collection at the University of Tennessee Herbarium (TENN). *Collection Forum* 32: 14-30.
- 2018 Korotkin HB, Swenie RA, Miettinen O, **Budke JM**, Chen K, Lutzoni F, Smith ME, Matheny PB. Stable isotope analyses reveal previously unknown trophic mode diversity in the Hymenochaetales. *American Journal of Botany* 105: 1869-1887.

- 2016 **Budke JM**, Goffinet B. Comparative cuticle development reveals taller sporophytes are covered by thicker calyptra cuticles in mosses. *Frontiers in Plant Science* 7: 832.
- 2016a Busta L, **Budke JM**, Jetter R. The moss *Funaria hygrometrica* has cuticular wax similar to vascular plants, with distinct composition on leafy gametophyte, calyptra and sporophyte capsule surfaces. *Annals of Botany* 118: 511-522.
- 2016b Busta L, **Budke JM**, Jetter R. Identification of β -hydroxy fatty acid esters and primary, secondary-alkanediol esters in cuticular waxes of the moss *Funaria hygrometrica*. *Phytochemistry* 121: 38-49.
- 2016 Ranjan A¹, **Budke JM**¹, Rowland SD¹, Chitwood DH, Kumar R, Ichihashi Y, Zumstein K, Maloof JN, Sinha NR. eQTL regulating Transcript Levels Associated with Diverse Biological Processes in Tomato. *Plant Physiology* 172: 328-340.
- 2013 **Budke JM**, Goffinet B, Jones CS. Dehydration protection provided by a maternal cuticle improves offspring fitness in the moss *Funaria hygrometrica*. *Annals of Botany* 111: 781-789.
- 2013 Liu Y, Forrest LL, Bainard JD, **Budke JM**, Goffinet B. Organellar genome, nuclear ribosomal DNA repeat unit, and microsatellites isolated from a small-scale of 454 GS FLX sequencing on two mosses. *Molecular Phylogenetics and Evolution* 66: 1089-1094.
- 2012 Wynne MA*, **Budke JM**. Examining the ability of calyptrae to produce protonema in *Funaria hygrometrica*. *Evansia* 29: 61-64.
- 2012 **Budke JM**, Goffinet B, Jones CS. The cuticle on the gametophyte calyptra matures before the sporophyte cuticle in the moss *Funaria hygrometrica* (Funariaceae). *American Journal of Botany* 99: 14-22. (Winner of the 2013 Grady L. Webster Publication Award.)
- 2012 Liu Y, **Budke JM**, Goffinet B. Phylogenetic inference rejects sporophyte based classification of the Funariaceae (Bryophyta): rapid radiation suggests rampant homoplasy in sporophyte evolution. *Molecular Phylogenetics and Evolution* 62: 130-145.
- 2011 **Budke JM**, Goffinet B, Jones CS. A hundred-year-old question: is the moss calyptra covered by a cuticle? A case study of *Funaria hygrometrica*. *Annals of Botany* 107: 1259-1277.
- 2011 Goffinet B, **Budke JM**, Newman LC*. Micromitriaceae: A new family of highly reduced mosses. *Taxon* 60: 1245-1254.
- 2011 Wickett NJ, Forrest LL, **Budke JM**, Shaw B, Goffinet B. Frequent pseudogenization and loss of the plastid-encoded, sulfate transport gene *cysA* throughout the evolution of liverworts. *American Journal of Botany* 98: 1263-1275.
- 2009 Larraín J, Herrera F, **Budke JM**, Goffinet B. Phylogenetic affinities and conservation status of the Chilean endemic *Costesia spongiosa* (Bryophyta: Gigaspermaceae). *The Bryologist* 112: 279-286.
- 2007 **Budke JM**, Jones CS, Goffinet B. Development of the enigmatic peristome of *Timmia megapolitana* (Timmiaceae; Bryophyta). *American Journal of Botany* 94: 460-467.
- 2006 **Budke JM**, Goffinet B. Phylogenetic analysis of Timmiaceae (Bryophyta: Musci) based on nuclear and chloroplast sequence data. *Systematic Botany* 31: 633-641.
- 2005 **Budke JM**, Hickey RJ, Heafner KD. Analysis of morphological and anatomical characteristics of *Isoetes* using *Isoetes tennesseensis*. *Brittonia* 57: 167-182.
- 2003 Luebke NT, **Budke JM**. *Isoëtes tennesseensis* (Isoëtaceae), an Octoploid Quillwort from Tennessee. *American Fern Journal* 93: 184-190.

Invited Reviews

- 2020 Oliver MG, **Budke JM**. Featured Herbarium: University of Tennessee, Knoxville Herbarium – TENN (U.S.A.). *The Vasculum* 15(2):20-27.

- 2018 **Budke JM**, Bernard EC, Gray DJ, Huttunen S, Piechulla B, Trigiano RN. Introduction to the Special Issue on Bryophytes. *Critical Reviews in Plant Sciences* 37:102-112.
- 2013 **Budke JM**. Common Mosses of the Northeast and Appalachians. *Plant Science Bulletin* 59(3): 131-132.

Point of View

- 2015 **Budke JM**. Postdocs: Improving our Visibility in the Research Workforce. *Plant Science Bulletin* 61(2): 40-44.
- 2014 Cain B¹, **Budke JM**¹, Wood KJ, Sweeney NT, Schwessinger B. How postdocs benefit from building a union. *eLife* 3: e05614.

RESEARCH FUNDING (active funding in bold)

- 2024-present NSF DBI-2423775, RAPID: Transferring the East Tennessee State University Herbarium to the University of Tennessee. Budke JM. (\$192,730)**
- 2023-present National Park Service, Shenandoah National Park - Inventory of rare bryophytes to inform high-use recreation site management. Budke JM. (\$83,191)**
- 2022 Scholarly and Research Incentive Fund (SARIF), Univ. of Tennessee: *Increasing the storage and research capabilities of the University of Tennessee – Knoxville Herbarium (TENN)*. PI: **Budke JM**. Co-PIs: C Kwit, PB Matheny, MG Oliver, E Schilling. (\$140,000)
- 2022 Faculty Research Assistants Funding, Office of Undergraduate Research & Fellowships, UTK (\$1,750)
- 2021-present NSF CAREER DEB-2046467, Systematics & Biodiversity Sciences - Integrating natural history collections to explore the functional morphology and evolution of the parent-offspring conflict in mosses. Budke JM. (\$1,441,660)**
- 2021 Faculty Research Assistants Funding, Office of Undergraduate Research & Fellowships, UTK (\$3,500)
- 2020-present NSF Digitization TCN DBI-2001500 - Collaborative: Building a global consortium of bryophytes and lichens: keystones of cryptobiotic communities (GLOBAL). Twenty-five collaborating institutions. Lead PI: Budke JM. (\$3,684,610 total, \$609,365 to UTK)**
- 2017 Technology Fee Funding Award for Teaching Microscopes, Univ. of Tennessee (\$49,490)
- 2009 International Association of Bryologists: Stanley Greene Award (\$1,100)
Botanical Society of America: Graduate Student Research Award (\$500)
American Microscopical Society: Graduate Student Research Award (\$700)
Henry N. Andrews Endowment Fund: University of Connecticut EEB (\$1,000)
- 2007 Ronald Bamford Endowment Fund: University of Connecticut EEB (\$800)
- 2006 Ronald Bamford Endowment Fund: University of Connecticut EEB (\$1,100)
- 2004 Ronald Bamford Endowment Fund: University of Connecticut EEB (\$1,275)
- 2002 Academic Challenge Fund: Miami University Botany (\$1,030)
W. S. Turrell Travel Grant: MU Herbarium, #181 *co-author C. Craig* (\$1,319)
- 2001 W. S. Turrell Travel Grant: MU Herbarium, #179 *co-author K. Gustafson* (\$695)

FELLOWSHIPS

- 2013 Katherine Esau Postdoctoral Research Fellowship, Univ. of Calif. – Davis (\$151,181)
- 2011 Graduate Summer Research Fellowship, Univ. of Conn. Graduate School (\$2,274)
- 2010 Doctoral Dissertation Fellowship Award, Univ. of Conn. Graduate School (\$2,000)
- 2008 East Asia Pacific Summer Institute Fellowship - EAPSI, NSF (\$10,000)

NIBB, Okazaki, Japan - *Hosts:* Dr. M. Hasebe and Dr. Y. Hiwatashi

AWARDS

- 2022 Undergraduate Research Mentor of the Year, Office of Undergraduate Research & Fellowships, UTK
- 2020 Faculty Academic Outreach Teaching Award, College of Arts & Sciences, UTK
- 2014 Postdoctoral Scholar Association Travel Award to International Association of Bryology World Conference in Cape Horn Biosphere Reserve, Chile (\$400)
- 2013 Grady L. Webster Structural Botany Publication Award - "For the most outstanding paper published in the *American Journal of Botany* in the field of structural and developmental botany over the two-year period prior to the award year." (\$1,000)
- 2011 Vernon I. Cheadle Student Travel Award, Botanical Society of America (\$500)
- 2010 Katherine Esau Award for the Best Student Paper in Developmental & Structural Botany, Botanical Society of America: *Beneath the calyptra's veil: Exploring cuticle anatomy during moss sporophyte development* (\$500)
- 2010 Developmental & Structural Section Student Travel Award, BSA (\$150)
- 2007 Conant Botanical Images Student Travel Award: Second Place (\$250)
- 2005 Graduate Research Fellowship, National Science Foundation: Honorable Mention
- 2003 Young Botanist Award, Botanical Society of America: Special Achievement
- 2003 Outstanding Woman Senior in Science, Engineering, and Technology, Miami Valley Association for Women in Science (AWIS)

SCIENTIFIC CONSULTING

Moss Identification for Tennessee Agricultural Crime Unit

Mar - Aug 2020

In collaboration with E. Shershen and M. Oliver, we worked with Special Agent Kuehn to assist with identifying mosses/lichens confiscated as evidence in two cases. We maintained a chain of custody for these specimens, and also wrote witness statements and two reports about the identifications and value of the moss/lichen material. These cases are currently active and Budke has been called upon to testify.

Calyptra - Video Installation by the artist Elitsa Ganeva, from Veliko Tarnovo, Bulgaria.

Shown at the 2017 Nakanajo Biennale art festival in Japan.

<http://www.elitsaganeva.com/calyptranakanajobiennale.html>

STAFF SUPERVISION

TENN Herbarium Collections Manager - Garrett Billings, M.S.	Oct 2024 – Present
Research Assistant (NSF CAREER) - Amy Okafor, B.S.	Aug 2024 – Present
TENN Herbarium Assistant - Tessa Nuchols, B.S.	Jul 2024 – Present
Computational Assistant - Julian Broughton, B.S.	Feb 2024 – May 2024
Research Assistant (NSF CAREER) - Blakeney Jordan, B.S.	Jan – Jul 2024
Research Assistant (Shenandoah NP Grant) - Liz Halasz, B.S.	Jan – May 2024
Lead Digitizer (NSF TCN) & Research Specialist - Alex Dowd, B.S.	Dec 2023 – Present
Project Manager (NSF TCN) - Miranda Zwingelberg, M.S.	Dec 2020 – Present
TENN Herbarium Collections Manager - Margaret Oliver, M.S.	Dec 2018 – Jun 2024
TENN Herbarium Collections Manager - Q. Victor Ma, Ph.D.	Jun 2016 – Jun 2018 (retired)
Research Specialist III - Mark D. Wienhold, M.S.	Dec 2016 – Aug 2019

FACULTY MENTORING COMMITTEES

Committee Member for Sebastian Stockmaier – Assist. Professor, EEB Dept., UTK Jan 2023 – Present

POSTDOCTORAL RESEARCHER SUPERVISION & MENTORING

Dr. Maryam Noroozizarmehri - *Analyzing the morphological evolution of structures integral to the parent-offspring conflict across the moss phylogeny.* Jan 2023 – Present

Dr. Nikisha R. Patel - *Analyzing spore morphological evolution in ferns and generating preliminary moss physiology data for grant applications.* Feb – Dec 2018

HESLER VISITING RESEARCHER COLLABORATIONS

Dr. Venuste Nsengimana, Director, Centre of Excellence in Biodiversity and Natural Resource Management at the University of Rwanda - *Effective and Sustainable Management of Natural Collections in Rwanda* Spring 2025

Ainun Nadhifah, Researcher at the National Research and Innovation Agency, Cibodas Botanical Garden
Unlocking hidden biodiversity: a new record of Neolepidozia cuneifolia for western Malesia and Solomon Islands. Oct – Nov 2022

Nikisha R. Patel, Graduate Student, University of Vermont - *Analyzing spore morphological evolution in ferns.* May & Sept 2017

GRADUATE STUDENT DISSERTATION/THESIS SUPERVISION & MENTORING

Ainun Nadhifah, Ph.D. student – *Systematics of the liverwort genus Neolepidozia* Aug 2023 – Present

Isabel Hildesheim, Ph.D. student – *Analyzing moss sporophyte resource acquisition.* Aug 2023 – Present

Vishal Kennedy, Ph.D. student – *Parent-offspring conflict in mosses.* Aug 2022 – Present

Julia Butler, M.S. – *Aquatic transitions and relationships in Fissidens mosses.* Completed May 2024

Eric Shershen, Ph.D. student – *Modeling bryophyte distributions & climate change.* Aug 2019 – Present

Alex Aromin, M.S. – *Examining the influence of calyptra size on sporophyte morphology in Funariaceae mosses.* Completed May 2021

GRADUATE STUDENT COMMITTEE MEMBER (If not noted, student at UTK)

Tonika Birmley, M.S. student - *The effect of ploidy on Galax urceolata pollen.* Nov 2023 – Present

Dusty Prather, Ph.D. student - *Ecophysiology of Onoclea sensibilis.* Nov 2023 – Present

Sam Wilhelm, Ph.D. student - *Pollination biology of the cedar glades.* Jan 2023 – Present

Nicholas Smith, Ph.D. student - *Relationships between migratory songbirds and fleshy-fruited plants during fall migration.* May 2022 – Present

Leigha Henson, M.S. (Appalachian State University) - *Warming and precipitation effects on several common moss species of the southern Appalachian Mountains.* Completed Aug 2024

Hope Ferguson, Ph.D. student - *Chance events & grad. student career intentions.* Apr 2021 – Present

Alex Faidiga, M.S. - *Exploring pollination biology in Viola.* Completed Dec 2021

Harmony Yomai, Ph.D. - *Breeding systems of flowering plants in Chuuk.* Completed Dec 2021

Margaurete Romero, Ph.D. student - *Exploring grad student scientific outreach.* May 2018 – Dec 2019

Hailee Korotkin, M.S. - *Stable isotopes, phylogenetics, and experimental data indicate a unique nutritional mode for Rickenella fibula, a bryophyte-associated fungus.* Completed Aug 2017

TENN HERBARIUM GRADUATE RESEARCH ASSISTANT SUPERVISION & MENTORING

Eric Shershen, Budke Lab - <i>Evaluating bryophytes on the TN Rare plant list.</i>	Jan 2024 – May 2024
Nicholas Smith, Kwit Lab - <i>Curating the large fruit, seed, & cone collection.</i>	Jan 2023 – May 2023
Julia Butler, Budke Lab - <i>Transcribing bryophyte specimens for GLOBAL TCN.</i>	Jan 2022 – May 2022
Alex Faidiga, Kalisz Lab - <i>Analyzing plant phenology using specimens.</i>	Jan 2021 – May 2021
Harmony Yomai, Williams Lab - <i>Label-making protocol development.</i>	Jan 2020 – May 2020
Amanda Benoit, Kalisz Lab - <i>Curating the macroalgae collection.</i>	Jan 2019 – May 2019
Chelsea Miller, Kwit Lab - <i>Curating a historic seed collection.</i>	Jan 2018 – May 2018
Ian Ware, Schweitzer/Bailey Labs - <i>Curating a historic seed collection.</i>	Jan 2017 – May 2017

UNDERGRADUATE STUDENT SUPERVISION & MENTORING***University of Tennessee, Knoxville******Budke Laboratory***

<i>Comparative water conducting cell development in Dicranum</i>	
Emma Vaughn - Major: Biology; Concentration: EEB	Aug 2024 – Present
<i>Evaluating bryophyte communities in Pickett State Park</i>	
Aspen Mazzatta - Major: Biology; Concentration: EEB	Feb 2024 – Present
2024 Lynne & Bob Davis Award for Student Natural History Research (\$4,200)	
<i>Molecular biology to explore parent-offspring conflict in mosses</i>	
Lily Cooper - Major: Plant Sciences	Oct 2023 – Dec 2024
Shekinah Pobi - Major: Biology; Concentration: BCMB	Aug 2023 – Present
Blakeney Jordan - Major: Biology; Concentration: EEB	Jun – Dec 2023
Angelina Strawn - Major: Biology; Concentration: EEB	Jun – Aug 2023
<i>Trialing protocol for moss chromosome squashes</i>	
Liam Cooley - Major: Biology; Concentration: EEB	Mar – Dec 2023
<i>Culturing Funariaceae moss species</i>	
Sarah Cleveland - Major: Plant Sciences, Public Horticulture	Sept 2022 – May 2023
Jack Kiernon - Major: Forestry; Concentration: Urban Forestry	Sept 2022 – Mar 2024
<i>Identifying moss collections from the GSMNP in collaboration with PhD student Eric Shershen.</i>	
Susanna Diamond - Major: Biology; Concentration: EEB	Sept 2020 – May 2022
2022 UTK Eureka Poster Presentation – Award of Excellence	
2021 Breedlove, Dennis Award for Student Botanical Fieldwork (\$500)	
2021 Dr. Clifford Amundsen Ecology Scholarship Endowment Award	
<i>Examining maternal-offspring interactions in mosses.</i>	
Julian Broughton - Major: Biology; Concentration: BCMB	Sept 2020 – Aug 2023
2022 UTK Eureka Poster Presentation – Award of Excellence	
Amy Okafor - Major: Biology; Concentration: BCMB	Sept 2020 – Aug 2024
2022 UTK Eureka Poster Presentation – Award of Excellence	
Haddy Salem - Major: Biology; Concentration: EEB	Sept 2020 – May 2022
Abygale Dixon - Major: Biology; Concentration: Microbiology	Sept 2020 – May 2021
Nathan Pace - Major: Biology; Concentration: EEB	Sept 2019 – May 2021
2021 College of Arts & Sciences, Volunteer of Distinction, Professional Promise Award	
2020 Breedlove, Dennis Award for Student Botanical Fieldwork (\$500)	
2020 Awarded Summer Undergraduate Research Internship Program funding	
Katherine Whitaker - Major: Biology; Concentration: EEB	Aug 2018 – May 2021

2021 College of Arts & Sciences, Volunteer of Distinction, Academic Achievement Award

2021 EEB Outstanding Undergraduate Research Award

Using herbarium specimens for molecular phylogenetic analyses of Fissidentaceae mosses.

Daniel Kirk - Major: Biology; Concentration: BCMB Jan 2018 – May 2019

Victoria Beard - Major: Biology; Concentration: Microbiology Sept 2017 – Dec 2018

Chelsea Carr - Major: Art History May 2018 – Aug 2018

Nathan Kingsley - Major: Biology; Concentration: EEB Jan 2017 – Jan 2018

Sarah Wike - B.S. Catawaba College, Post-bac in EEB at UTK Jan 2017 – Apr 2017

TENN Herbarium Curation Technicians & Interns

63 students trained in databasing & curating plant biodiversity specimens. Fall 2016 – Present

Spring 2018 - Team of nine students curated Dr. Marie Hicks Liverwort collection.

Spring 2017 - Team of six students reorganized moss collection of 150,000 specimens.

Award Winning Curation Technicians

Dana Frankenstein - 2024 UTK Volunteer of Distinction Award, Outstanding Postgraduate

Emma Kruse - 2022 UTK Volunteer of Distinction Award for Professional Promise

Madison Dyer - 2022 UTK Volunteer of Distinction Award for Professional Promise

Ashley Fish - 2022 UTK Volunteer of Distinction Award for Professional Promise

Ryan Vichich - 2021 UTK Volunteer of Distinction Award for Professional Promise

Helen Law - 2020 UTK Chancellor's Award for Extraordinary Professional Promise

Vanessa Harpe - 2019 UTK Chancellor's Award for Extraordinary Professional Promise

University of California, Davis

4 students trained in molecular & developmental biology of mosses. Feb 2013 – Dec 2015

PLANTS Program - Botanical Society of America (Preparing Leaders and Nurturing Tomorrow's Scientists: Enhancing Diversity in Plant Science), Junior Mentor – 2012

University of Connecticut

7 students trained in molecular systematics, microscopy, and sterile culture. Jan 2008 – Dec 2012

INVITED PRESENTATIONS

2024 Seminar – Department of Ecology and Evolutionary Biology, University of Connecticut

2024 Seminar – Friedrich Schiller University Jena, Jena, Germany

2022 Seminar – Manipal Centre for Natural Sciences, Manipal, India (Virtual)

2020 Seminar – Department of Plant Sciences, Univ. of Tennessee

2019 Paul Burton Seminar Series – Department of Biology, Western Carolina University

2018 Seminar – Department of Biology, University of Florida

2016 Ronneberg Lecture Series Seminar – Department of Biology, Denison University

2016 Seminar – Department of Plant Biology, University of Minnesota

2016 Seminar – Department of Ecology and Evolutionary Biology, Univ. of Tennessee

2016 Seminar – Department of Biology, University of West Georgia

2015 Lester Newman Seminar Series – Department of Biology, Portland State University

2013 Postdoctoral Research Seminar Series – University of California, Davis

CONFERENCE PRESENTATIONS (Oral presentation unless noted. Presenting author underlined.)

- 2024 Noroozizarmehri M, **Budke JM**. The conflict between gametophyte parents and sporophyte offspring: examining morphological evolution across moss species with different sexual systems. BOTANY conference.
- 2024 Shershen E, **Budke JM**. Examining bryophyte community changes in the southern Appalachians using herbarium records. American Bryological and Lichenological Society Annual Meeting.
- 2024 Hildesheim I, **Budke JM**. Examining the relationship between sporophyte morphology and resource transport rates in mosses. American Bryological and Lichenological Society Annual Meeting.
- 2024 Kennedy VN, **Budke JM**. Unraveling the Tug of War: Investigating Parent-Offspring Conflict in Mosses. American Bryological and Lichenological Society Annual Meeting.
- 2024 Butler JR, **Budke JM**. Aquatic transitions and interspecific relationships in *Fissidens* mosses. American Bryological and Lichenological Society Annual Meeting.
- 2024 Butler JR, **Budke JM**. Untangling Interspecific Relationships Between Aquatic Taxa in the Moss Genus *Fissidens*. Association of Southeastern Biologists Annual Meeting.
- 2024 Okafor AN, **Budke JM**. Differences in sporophyte conducting cell anatomy between two moss species. Association of Southeastern Biologists Annual Meeting. **Poster presentation.**
- 2024 Oliver MG, Shershen E, **Budke JM**. Determining the spatial distribution of vascular plants in Knox County, Tennessee using digitized herbarium specimens. Association of Southeastern Biologists Annual Meeting. **Poster presentation.**
- 2023 **Budke JM**. The conflict between gametophyte parents and sporophyte offspring: examining morphological evolution across moss species with different sexual systems. BOTANY conference. **Invited colloquium speaker.**
- 2023 Bendull H, Lewis R, **Budke JM**. The State of Herbarium Backlogs: Perspectives from Bryophyte Collections. BOTANY conference. **Invited symposium speaker.**
- 2023 Butler J, **Budke JM**. Untangling Aquatic Transitions and Interspecific Relationships in the Moss Genus *Fissidens*. BOTANY conference.
- 2023 Bendull H, Lewis R, **Budke JM**. The State of Herbarium Backlogs: Perspectives from Bryophyte Collections. Association of SE Biologists Annual Meeting. **Invited symposium speaker.**
- 2022 **Budke JM**. Building a global consortium of bryophytes and lichens: keystones of cryptobiotic communities (GLOBAL). (BioDigiCon)
- 2022 Shershen E, Stehn S, **Budke JM**. Bryophyte communities change over a 12-year period along an elevational gradient in the Great Smoky Mountains National Park. BOTANY conference.
- 2021 **Budke JM**, von Konrat M. Building a global consortium of bryophytes and lichens: keystones of cryptobiotic communities (GLOBAL). (Virtual ADBC Summit)
- 2021 **Budke JM**, Wienhold MD, Patel NR. Exploring relationships in the moss genus *Fissidens* using molecular data generated from herbarium specimens. 'Bryophytes, lichens, and northern ecosystems in a changing world' (BL2021). **Invited symposium speaker.**
- 2021 **Budke JM**, von Konrat M, et al. (55 additional coauthors) Building a global consortium of bryophytes and lichens: keystones of cryptobiotic communities (GLOBAL). 'Bryophytes, lichens, and northern ecosystems in a changing world' (BL2021).
- 2020 Whitaker K, **Budke JM**. Exploring sporophyte transpiration rates in mosses. Botanical Society of America (BSA) Annual Meeting. **Honorable Mention for A.J. Sharp Award.**
- 2020 **Budke JM**, Oliver MG. TENN Herbarium Excursions to Evaluate Historic Populations of Seedless Plants. Tennessee Plant Conservation Alliance Annual Meeting.
- 2019 **Budke JM**, Patel NR, Wienhold MD. Exploring relationships in the moss genus *Fissidens* using molecular data generated from herbarium specimens. BOTANY conference. **Invited colloquium speaker.**

- 2018 **Budke JM**, Wienhold MD. Exploring relationships in the moss genus *Fissidens* using molecular data generated from herbarium specimens. American Bryological and Lichenological Society (ABLS) Annual Meeting
- 2018 **Patel NR**, Fawcett S, Sundue MA, **Budke JM**. A Phylogenetic Perspective on Perispore Morphology of Thelypteridaceae. BOTANY conference.
- 2016 **Medina R**, Johnson M, Liu Y, **Budke JM**, Wilding N, Hedderson T, Wickett N, Goffinet B. Zooming in on the rapid radiation of the Funariaceae. BSA Annual Meeting
- 2015 **Budke JM**. Comparative cuticle development in morphologically divergent mosses of the Funariaceae. BOTANY conference.
- 2015 **Busta L**, **Budke JM**, Jetter R. Cuticular waxes from the gametophyte, sporophyte, and calyptra of the moss *Funaria hygrometrica*. BOTANY conference.
- 2015 **Budke JM**, Busta L, Jones CS, Goffinet B. Beneath the veil of the calyptra: exploring cuticle anatomy during moss sporophyte development in the Funariaceae. International Association of Bryologists Conference
- 2013 **Busta L**, **Budke JM**, Jetter R. Cuticular Waxes from the Gametophyte, Sporophyte, and Calyptra of the Moss *Funaria hygrometrica*. Phytochemical Society of North America Annual Meeting (**Awarded Best Student Presentation**)
- 2013 Liu Y, **Medina R**, Wilding N, **Budke JM**, Hedderson T, Goffinet B. The evolutionary history of *Physcomitrella patens*: phylogenetic inferences from 4 loci within the Funariidae. BOTANY conference.
- 2012 **Budke JM**, Jones CS, Goffinet B. Sporophyte development and calyptra cuticle function in *Funaria hygrometrica*. MOSS 2012
- 2012 **Goffinet B**, Liu Y, Wilding N, **Budke JM**. Phylogenetic inferences in the Funariaceae: inferences from 10 versus 4 loci. 3rd International Symposium on Molecular Systematics of Bryophytes
- 2011 **Budke JM**, Goffinet B, Jones CS. Experimental manipulation of the moss calyptra: The effect of cuticle removal and desiccation on sporophyte development in *Funaria hygrometrica*. BOTANY conference.
- 2011 Liu Y, **Budke JM**, Goffinet B. Phylogenetic inference rejects sporophyte-based classification of the Funariaceae (Bryophyta): a rapid radiation suggests rampant homoplasy in sporophyte evolution. BOTANY conference.
- 2011 Liu Y, **Budke JM**, **Goffinet B**. Phylogenetic inference suggests rampant homoplasy in sporophyte evolution in the Funariaceae. MOSS 2011
- 2010 **Budke JM**. Examining the gametophytic calyptra and its role in moss sporophyte development using the cord moss (*Funaria hygrometrica*). Society for Integrative and Comparative Biology Annual Meeting
- 2010 **Budke JM**, Goffinet B, Jones CS. Beneath the calyptra's veil: Exploring cuticle anatomy during moss sporophyte development. BOTANY conference.
- 2010 Liu Y, **Budke JM**, **Goffinet B**. Phylogenetic relationships of *Physcomitrella* and other Funariaceae based on inferences from 10 genes. BOTANY conference.
- 2007 **Budke JM**, Wickett NJ, Goffinet B. Multiple losses of the *cysA* gene from the chloroplast genome of liverworts (Marchantiophyta). BOTANY conference.
- 2006 **Budke JM**, Goffinet B. Phylogenetic analyses of Timmiaceae (Bryophyta: Musci) inferred from nuclear and chloroplast sequence data. BOTANY conference.
- 2005 **Budke JM**, Jones CS, Goffinet B. Peristome development in *Timmia megapolitana* in relation to systematics and evolution of the Bryophyta. BOTANY conference.
- 2004 **Budke JM**. Peristome development in *Timmia megapolitana*. Northeast Ecology and Evolution Conference

- 2003 **Budke JM**, Hickey RJ, Heafner KD. Morphological characterization of North America's first octoploid *Isoetes*. BOTANY conference.
- 2003 **Hickey RJ**, **Budke JM**. 2003. The sella and its derivatives in *Isoetes*. BOTANY conference.
- 2002 **Budke JM**, Hickey RJ, Heafner KD. Morphological characterization of North America's first octoploid quillwort. Association of Southeastern Biologists Annual Meeting

TEACHING

Assistant Professor: *University of Tennessee – Knoxville*

- EEB 330/602 – Field Botany Falls, 2017-2021 (Online 2020), 2023
- EEB 496/607 – Natural History Collections Research Falls, 2018-2021 (Hybrid 2020), 2023

Adjunct Lecturer: *University of California - Davis*

Everybody Eats: Investigating Biological Threats to your Favorite Foods Fall 2014 & Spring 2015
Designed and taught an original course as instructor of record for ACCESS-R. UC Davis program to improve retention of first-generation to college and students from underrepresented groups in the sciences. Team-taught with Dr. H. Atamian, Spring 2015. Awarded a \$500 mini-grant for supplies, both quarters.

Guest Lectures

University of Tennessee – Knoxville

- Natural History Collections Research – Topic: Herbarium Research Fall 2022
- Career & Professional Development – Topic: Careers in Biology Collections Spring 2021
- Theory & Methods in EEB – Topic: Analyzing Scientific Research Springs 2020 & 2022
- Introductory Plant Biology – Topic: Plant Biodiversity Collections Fall 2016 & 2017
- Wildlife, Vegetation, and Habitat – Topic: Plant Biodiversity Collections Fall 2016
- Field Botany – Topic: Plant Biodiversity Collections Fall 2016

University of California - Davis

- Graduate Seminar – Topic: Preparing for the NSF GRFP Fall 2014 & 2015
- Graduate Course in Plant Development – Topic: Moss Developmental Genetics Winter 2015
- iAMSTEM summer orientation program – Topic: Science Communication Summer 2014

Western Connecticut State University, Biological and Environmental Sciences

- Genetics – Topic: Transformation of Non-Model Species Spring 2014

University of Connecticut, Cooperative Extension Center, Master Gardener Program

- Biology and Identification of Mosses and Liverworts Oct 2012

University of Connecticut, Ecology and Evolutionary Biology

- The Summer Flora – Topic: Bryophytes, Summer 2011; Plant Anatomy – Topic: Shoot apical meristems, Fall 2010; Bryology and Lichenology – Topic: Morphogenesis, Spring 2006.

TRAINING IN EDUCATION & CONFLICT RESOLUTION

- ROOT & SHOOT Bystander Intervention Training**, Summer 2023
Botanical Society of America, facilitated by the ADVANCEGeo Partnership
- Virtual Vol Bootcamp, Online Education Workshop**, Summer 2020
University of Tennessee – Knoxville, Teaching & Learning Innovation & the Office of the Provost
- “Mobile” Summer Institutes (MoSI) on Undergrad STEM Education Workshop**, May 13-16, 2019
University of Tennessee – Knoxville, Division of Biology, Biological Sciences Teaching and Learning
- College Teaching Seminar**, Winter 2014
University of California - Davis, Center for Excellence in Teaching and Learning

TEACHING MATERIALS

Peer reviewed brochure to teach plant biology concepts to students using mosses.

Swanson J, **Budke JM**, and Goffinet B. 2012. A visit to the miniature forest: insights into the biology and evolution of bryophytes in Northeastern Connecticut. Available through the *PlantED Digital Library*.

Peer reviewed laboratory exercises to teach the concept of chemical competition in plants.

Swanson J, **Budke JM**, and Goffinet B. 2012. Chemical competition in plants using the moss *Sphagnum*. *PlantED Digital Library*. <http://planted.botany.org/> Featured in the *Plant Science Bulletin* 60(4): 198, 2014.

Moss Culturing Protocol for high school teacher workshop at MOSS 2012 conference.

Mosses and the Plant Life Cycle by LE Parker*, **JM Budke**, and B Goffinet. (* undergraduate collaborator)

Biology Textbook Image - Invited

Scanning electron micrograph of moss peristome teeth by **JM Budke**, in *Introduction to Plant Biology*, 4th-6th editions by JD Mauseth, non-vascular plants chapter.

FIELD BOTANY EXPERIENCE

Botanical Outreach

Spring Wildflower Pilgrimage Springs 2016-2019, 2022-2024

Great Smoky Mountains National Park: Fern and Moss Walk Leader

Outdoor Presentations on Mosses (12 total) and Ferns (1) Summers 2005 – 2012

Leading botanical explorations at local nature centers and state parks in Connecticut.

Connecticut Bioblitz Summers 2005, 2007, 2009

24-hour biological survey of a park with scientists, students, and the public.

All Taxa Biodiversity Inventory (ATBI) Summers 2001 – 2003

Great Smoky Mountains National Park: Fern Foray Participant

Bryology Forays

Blomquist Bryological Foray March 15-17, 2024

Crowders Mountain State Park, North Carolina & King's Mountain State Park, South Carolina

Andrew's Bryological Foray, Kings Gap State Park, Carlisle, Pennsylvania Sept 22-24, 2023

SoBeFree: Spring Outing; Botanical Excursion; Foray, Retreat, & Escape to the Environment

Multiple sites across California 2014, 2015, & 2016

A. Leroy Andrews Foray, Woodstock Valley, Connecticut Sept 18-20, 2009

Blomquist Foray, Haywood County, North Carolina Oct 4-6, 2002

PUBLIC AND COMMUNITY OUTREACH

What the Moss – Easy as Play's Creative Director, Kashina Hickson Summer 2023 – Present

Developed a moss field guide & exploration pack for local libraries.

Darwin Day at the McClung Museum of Natural History Feb 2024

Introduced families to moss substrates and spore dispersal through hands-on activities.

Worldwide Engagement for Digitizing Biocollections (WeDigBio) Oct 2021, 2022 & Apr 2022, 2023

Leader for NSF GLOBAL TCN virtual natural history collection transcription event.

At each event ~100 community scientists & UTK undergrads transcribed thousands of specimen labels.

SciComm Celebration Day at Botany 2020 July 27, 2020

Featured science communicator for Moss Plants and More blog and @UTKHerbarium outreach.

Outside/In – A Podcast from New Hampshire Public Radio May 21, 2020

Featured guest expert for *Mold and Moss* episode - <http://outsideinradio.org/shows/moldandmoss>

Knoxville Botanical Garden – Presentation on Mysterious Mosses 2019 – 2024

Once to twice annual evening talk to the public about moss plant biology.

- Expanding Your Horizons STEM Activity Day** Nov 9, 2019
Plant specimen mounting activity at the TENN Herbarium for ~45, 5th-8th grade girls.
- Moss Plants and More: Commentary on All Things Bryological** Oct 2007 – May 2016
Monthly updated online bryology blog. Communicating science to the public.
<http://mossplants.fieldofscience.com>
Featured in Plant Cuttings: News in Botany. *Annals of Botany* 10: iv-vi, 2012.
- University of Tennessee Science Forum** Sept 30, 2016
Talking to the public about biodiversity collections and herbaria.
- University of California – Davis, Biodiversity Museum Day** Feb 13, 2016
In collaboration with four undergraduate students, we led members of the public through four hands-on activities exploring mosses using herbarium specimens.
- Kindergarten class at American Lakes School, Sacramento, California** Apr 10, 2014
In collaboration with S. Komar, we designed and led students through two hands-on classroom activities exploring the relationships between plant structures & functions.
- Discovery Museum Science & Space Center – Volunteer with AWIS** Feb 22, 2014
Helping families navigate activities about dinosaurs, fossils, rocks, and crystals.

PROFESSIONAL SERVICE

Manuscript Reviewer: *American Fern Journal, American Journal of Botany, Annals of Botany, AoB Plants, Biological Invasions, Botanical Journal of the Linnean Society, Castanea, Cryptogamie-Bryologie, Ecology and Evolution, Frontiers in Plant Science, Herzogia, Journal of Biogeography, Journal of Bryology, Nature Communications, New Phytologist, Plant Biology, Plant Cell, Plant Physiology, Plant Science Bulletin, Protoplasma, Rodriguésia, The Bryologist.*

Guest Editor: *Bryophyte Diversity and Evolution* - Special issue honoring Dr. Jeff Duckett - 2022

Panel Discussion Participant:

- Society for Future Women in Medicine: How to Get Involved in Research Oct 17, 2024
Association for Women in Science (AWIS) – Knoxville: Lunch and Learn Oct 11, 2024
Postdoctoral Fellowship Writing: Learning from Colleagues Feb 25, 2014
Sponsored by the postdoc union (UAW 5810) at the University of California – Davis

Departmental Service:

- 2023 - Present** UTK EEB Graduate Student Affairs Committee Member
2022 UTK EEB Plant Ecophysiology Search Committee, Chair
2022 UTK EEB Head Search Committee, Member
2016 - Present UTK EEB Collections Committee, Chair, Awards approximately \$30K funds annually to faculty, visiting researchers, and undergrads, and grad students from the Hesler Herbarium, Breedlove Dennis Botanical Fieldwork, Holton, and Hochman Funds.
2016 UTK EEB Field Station Committee, Member

University of Tennessee Service:

- 2022 - Present** UTK Plant Research Center Board Member
2022 Judging Committee - Cokkinias-Fite Awards from the Division of Biology
2021 NSF CAREER Writing Institute, Office of Research & Engagement: Panel Participant

Regional Service:

- 2023 - Present** Southern Appalachian Botanical Society: **Membership Coordinator**
- 2021 - 2023 Southern Appalachian Botanical Society: Member-at-Large
- 2021 - Present** Tennessee Plant Conservation Alliance: **Steering Committee Member**
- 2018 - Present** Tennessee Rare Plant Scientific Advisory Committee: **Voting Member**

National & International Service:

- 2023 - Present** American Bryological and Lichenological Society: **President-Elect**
- 2023 - Present** Society of Herbarium Curators: **Membership Committee: Chair (2024-Present)**
- 2023 - Present** Society of Herbarium Curators, Southeast Chapter: **Membership Committee**
- 2022 - Present** **Judging Committee - D.R. Kaplan Dissertation Award in Comparative Morphology**
- 2022 Judging Committee - Association of Southeastern Biologists Student Awards
- 2022 Judging Committee - Southern Appalachian Botanical Society Student Awards
- 2021 - Present** **International Association of Bryologists: Council Member**
- 2021 - 2023 Botanical Society of America, Cheadle Award Committee: **Chair**
- 2020 - 2023 Botanical Society of America, Developmental and Structural Section: **Chair**
- 2020 Social Media Team Member for the SPNHC/NATHIST Virtual Conference
- 2021 - 2023 Society of Herbarium Curators: **Social Media & Promotions Committee: Chair**
- 2019 - 2022 Society of Herbarium Curators: **Member-at-Large**
- 2019 - 2022 Judging Committee - ASPT Graduate Student Awards
- 2017 - Present** **Proposal Reviewer (panel and ad hoc): National Science Foundation**
- 2017 - 2022 Proposal Reviewer American Society of Plant Taxonomists (Grad Student Awards)
- 2017 Prince Claus Fund for Culture and Development in the Netherlands, **Reviewer**
- 2016 & 2018 Judging Committee - A.J. Sharp Award, Am. Bryological and Lichenological Society
- 2015 Judging Committee - Grady L. Webster Award, Botanical Society of America
- 2013 - 2019 American Bryological and Lichenological Society: **Member-at-Large**
- 2013 - 2015 Judging Committee - Esau Award (Chair in 2015), BSA Conference
- 2013 Judging Committee - Triarch Student Botanical Image Award

Member: *Association for Women in Science, Association of Southeastern Biologists, American Bryological and Lichenological Society, Botanical Society of America, International Association of Bryologists, Society for the Preservation of Natural History Collections, Society of Herbarium Curators, Southern Appalachian Botanical Society, Tennessee Native Plant Society.*