

Steven Thomas Callen

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Current Position

2015 – 2016 Saint Louis University Dissertation Fellow, Department of Biology, Saint Louis University, St. Louis, MO

Education

2016 Ph.D. in Biology with Distinction. Program in Ecology, Evolution, and Systematics, Saint Louis University and Missouri Botanical Garden, St. Louis, MO.
Dissertation title: “Climatic niche, breeding system, and fine-scale population genetic structure of native and invasive kudzu (*Pueraria montana*) populations.”
Advisor: Dr. Allison Miller

2006 Post-baccalaureate Non-degree Seeking coursework in immunology, University of Missouri – Columbia, Columbia, MO.
Advisor: Dr. Charles Brown

2004 B.S. in Biology, Honors College, University of Missouri – Columbia, Columbia, MO.
Advisor: Dr. James Carrel

Appointments

2015 – 2016 Saint Louis University Dissertation Fellow, Saint Louis University

2012 – 2015 Graduate Research Assistant, Saint Louis University; Advisor: Dr. Allison Miller

2010 – 2012 Graduate Teaching Assistant (Lab and Lecture), Saint Louis University

2010 – 2011 High School and Grade School Benchmark Test Writer, Data Driven Software Company, Arkansas

2007 – 2010 General and Advanced Placement Biology High School Teacher, Central High School, Helena, AR

2007 – 2009 Teach for America Corps Member, Mississippi Delta

2005 – 2007 Immunology Research Technician, University of Missouri – Columbia

2004 – 2005 Microbiology Teaching Assistant (Lab), University of Missouri – Columbia

2000 – 2002 Psychology Research Assistant, University of Missouri – Columbia; Advisor: Dr. Debora Bell; Children’s Evaluation of Life Events Project

Additional Training

- R Basics Workshop, Center for Conservation and Sustainable Development Missouri Botanical Garden, completed May 22-24, 2013 (27 hours)
- Basic JMP Genomics workshop, Saint Louis University, completed November 15, 2012
- Basic Python programming, SQLite, and Git Version Control: Software Carpentry Workshop at Washington University in Saint Louis, completed November 10-11, 2012 (16 hours)
- DNA Banking workshop, Missouri Botanical Garden, St. Louis, MO, January 3-4, 2013
- Collaborative Institutional Training Initiative (CITI) Online Course in the Responsible Conduct of Research, completed April 30, 2011
- Coursework in Geographic Information Systems (GIS) using ArcGIS and DIVA-GIS software (Fall 2010) and in Remote Sensing (Fall 2013) at Saint Louis University, St. Louis, MO

Research Interests

Plant evolutionary ecology; population genomics; plant domestication and agronomy; invasion and pollination biology; integrating climate, genomic, phenological, morphological, socioeconomic, demographic, remote sensing, and geographic information system (GIS) data to investigate factors influencing the distribution of populations and species; mating system evolution; impacts of climate/environmental change on adaptation; science policy and education.

GRANTS AND AWARDS

Grants and Other Research Funding

- 2013 Chinese Academy of Sciences, Key Laboratory of Plant Diversity and Biogeography of East Asia. “A comparative analysis of the pollination, mating system, and fine-scale spatial genetic structure of native and introduced kudzu (*Pueraria montana*).” In collaboration with Dr. Wang Hong at Kunming Institute of Botany (\$13,333)
- 2013 National Science Foundation East Asian and Pacific Summer Institute Award. “A comparative analysis of floral reproductive traits between native and introduced kudzu (*Pueraria montana*).” Kunming Institute of Botany, Yunnan, China. Host scientist: Dr. Wang Hong (\$5070)
- 2013 Saint Louis University Graduate Student Association Brennan Summer Doctoral Dissertation Award. “Clonal diversity and fine-scale population structure of native and invasive kudzu (*Pueraria montana*) populations.” (\$2000)
- 2012 Webster Groves Nature Study Society Mickey Scudder Scholarship in Field Biology. “Population ecology of the invasive species *Pueraria montana* (kudzu) over a latitudinal gradient” (\$1000)

Fellowships and Awards

- 2016 PlantingScience Fellowship for Botanical Society of America’s Digging Deeper Project
- 2015 Saint Louis University Dissertation Fellowship
- 2014 Botanical Society of America Congressional Visits Day delegate, Washington, D.C.
- 2013 National Science Foundation East Asian and Pacific Summer Institute Fellowship
- 2013 First Place Poster in Biological Sciences, 19th Annual Saint Louis University Graduate Student Association Research Symposium, St. Louis, MO
- 2012 – 2016 Botanical Society of America PlantingScience Master Plant Science Liaison/Mentor
- 2012 National Science Foundation Graduate Research Fellowship Honorable Mention
- 2012 Saint Louis University Graduate Student Association Conference Travel Award
- 2011 Best Student Poster, Botanical Society of America Ecological Section Award, Annual meetings of the Botanical Society of America and the American Society of Plant Taxonomists, St. Louis, MO
- 2011 National Science Foundation Graduate Research Fellowship Honorable Mention
- 2009 – 2010 Central High School Teacher of the Year
- 2007 – 2009 AmeriCorps Education Award, Teach for America
- 2004 Honors Graduate Certificate, University of Missouri – Columbia
- 2004 National Dean’s List
- 2001 – 2002 G.E. Huggins Undergraduate Scholarship, University of Missouri – Columbia
- 2000 Excellence Scholarship Award, University of Missouri – Columbia

PUBLICATIONS AND PRESENTATIONS

Published Articles

- Callen, S.T.**, L.L. Klein, and A.J. Miller. 2016. Environmental niches of North American *Vitis* species. *Journal of Enology and Viticulture*. In press.
- Callen, S.T.** and A.J. Miller. 2015. Signatures of niche conservatism and niche shift in the North American kudzu (*Pueraria montana*) invasion. *Diversity and Distributions* 21(8): 853-863.

Brown, C.R., A.Y.-C. Lai, **S.T. Callen**, V.A. Blaho, J.M. Hughes, and W.J. Mitchell. 2008. Adenoviral delivery of Interleukin-10 fails to attenuate experimental Lyme disease. *Infection and Immunity* 76: 5500-5507.

Manuscripts in Preparation

- Callen, S.T.**, W. Zhou, H. Wang, and A.J. Miller. Clonal diversity and fine-scale population genetic structure of native and invasive kudzu (*Pueraria montana*) populations. *In preparation for submission to New Phytologist*. Draft available.
- Callen, S.T.**, J. Zweck, Z.-X. Ren, P. Bernhardt, and A.J. Miller. Pollination biology and breeding system of the invasive vine kudzu (*Pueraria montana*) in native and invasive populations. *In preparation for submission to Annals of Botany*. Draft available.
- Miller, A.J., S. Sarmiento, M. Joseph, J. Timmer, **S.T. Callen**, and C. McAllister. Mate limitation and reduced fertility in a clonally propagated perennial crop: horseradish (*Armoracia rusticana* L.). *In preparation for submission to New Phytologist*.

Published Abstracts

- Callen, S.T.**, J. Zweck, Z.-X. Ren, T. Zander, R. O'Hanlon, M. Greg, P. Bernhardt, and A.J. Miller. 2015. Mating on the edge: pollination biology and mating system of the invasive vine kudzu (*Pueraria montana*) in Missouri (USA) populations. Saint Louis University Graduate Student Association Research Symposium; St. Louis, MO.
- Miller, A.J. and **S.T. Callen**. 2014. Comparative transcriptome and ionome analysis in two closely related North American grapevines (*Vitis riparia* and *V. rupestris*) in a common garden. Annual meetings of the Botanical Society of America and the American Society of Plant Taxonomists (Botany meetings); Boise, ID.
- Callen, S.T.**, J. Zweck, T. Zander, A.J. Miller, and P. Bernhardt. 2013. Sexual reproduction and self-compatibility of the invasive vine kudzu (*Pueraria montana*) in Missouri roadside populations. Annual meetings of the Botanical Society of America and the American Society of Plant Taxonomists (Botany meetings); New Orleans, LA.
- Callen, S.T.**, J. Zweck, T. Zander, A.J. Miller, and P. Bernhardt. 2013. Sexual reproduction and self-compatibility of the invasive vine kudzu (*Pueraria montana*) in Missouri roadside populations. Saint Louis University Graduate Student Association Research Symposium; St. Louis, MO.
- **Awarded first place poster in Biological Sciences Section**
- Callen, S.T.**, I. Jiménez, J. Knouft, and A.J. Miller. 2012. Climatic niche shift in kudzu, *Pueraria montana* var. *lobata*, upon invasion into North America. Annual meetings of the Botanical Society of America and the American Society of Plant Taxonomists (Botany meetings); Columbus, OH.
- Callen, S.T.**, J. Knouft, and A.J. Miller. 2012. Assessing the environmental niches of native and introduced *Pueraria montana* (kudzu). Saint Louis University Graduate Student Association Research Symposium; St. Louis, MO.
- Callen, S.T.**, J. Knouft, and A.J. Miller. 2011. Assessing the environmental niches of native and introduced *Pueraria montana* (kudzu). Annual meetings of the Botanical Society of America and the American Society of Plant Taxonomists (Botany meetings); St. Louis, MO.
- **Awarded best student poster in Ecology Section**

Invited Presentations

- 2016 Missouri Botanical Garden, St. Louis, MO
- 2014 Fourth Annual Saint Louis Ecology, Evolution, and Conservation Retreat, Southern Illinois University, Edwardsville, IL
- 2014 Kunming Institute of Botany, Yunnan, China
- 2014 Saint Louis University Seminar Series, St. Louis, MO
- 2013 Missouri Native Plant Society, St. Louis, MO
- 2013 Kunming Institute of Botany, Yunnan, China
- 2013 Yunnan University, Yunnan, China

- 2013 Missouri Viticulture and Enology Research Alliance Symposium, Missouri Botanical Garden, St. Louis, MO
- 2012 Webster Groves Nature Study Society Annual Banquet, St. Louis, MO

Other Presentations

- 2015 “Evolutionary ecology of invasive species.” EducationUSA Leadership Institute Conference at Missouri Botanical Garden; St. Louis, MO
- 2015 “Mating on the edge: pollination biology and mating system of the invasive vine kudzu (*Pueraria montana*) in Missouri (USA) populations.”
- Saint Louis University Graduate Student Association Research Symposium; St. Louis, MO
- 2014 “Sexual reproduction and self-compatibility of the invasive vine kudzu (*Pueraria montana*) in two Missouri roadside populations.”
- Missouri Botanical Garden Science and Conservation Research Open House; St. Louis, MO
 - Saint Louis Zoo Pollinator Exhibition Night; St. Louis, MO
 - Missouri Botanical Garden Henry Shaw Dinner; St. Louis, MO
- 2014 “Comparative transcriptome and ionome analysis in two closely related North American grapevines (*Vitis riparia* and *V. rupestris*) in a common garden.” Annual meetings of the Botanical Society of America and the American Society of Plant Taxonomists (Botany meetings); Boise, ID
- 2013 “Sexual reproduction and self-compatibility of the invasive vine kudzu (*Pueraria montana*) in two Missouri roadside populations.”
- Annual meetings of the Botanical Society of America and the American Society of Plant Taxonomists (Botany meetings); New Orleans, LA
 - 19th Annual Saint Louis University Graduate Student Association Research Symposium; St. Louis, MO
 - Saint Louis Zoo Pollinator Exhibition Night; St. Louis, MO
 - Third Annual Saint Louis Ecology, Evolution, and Conservation Retreat, Saint Louis Zoo; St. Louis, MO
 - 60th Annual Missouri Botanical Garden Systematics Symposium; St. Louis, MO
- 2013 “The good side of invasive species: experimenting, establishing collaborations, and exchanging culture in China.”
- East Asian and Pacific Summer Institute Closing Ceremony; Beijing, China
 - Third Annual Saint Louis Ecology, Evolution, and Conservation Retreat, Saint Louis Zoo; St. Louis, MO
- 2012 “Climatic niche shift in kudzu, *Pueraria montana* var. *lobata*, upon invasion into North America.” Annual meetings of the Botanical Society of America and the American Society of Plant Taxonomists (Botany meetings); Columbus, OH
- 2012 “Has *Pueraria montana* (kudzu) undergone an environmental niche shift upon invasion?”
- First Annual Saint Louis Ecology, Evolution, and Conservation Retreat, Washington University Tyson Research Center; St. Louis, MO
 - 18th Annual Saint Louis University Graduate Student Association Research Symposium; St. Louis, MO
- 2011 “Has *Pueraria montana* (kudzu) undergone an environmental niche shift upon invasion?” Annual meetings of the Botanical Society of America and the American Society of Plant Taxonomists (Botany meetings); St. Louis, MO

TEACHING

Courses for which I served as a teaching assistant

- 2011 – 2012 *Principles of Biology I and II* (BIOL 104/106), Lab Assistant, Saint Louis University
- 2011 *Principles of Biology II* (BIOL 106), Lecture Assistant, Saint Louis University

- 2010 *Principles of Biology I* (BIOL 104), Lab Assistant, Saint Louis University
2004 *Medical Microbiology*, Lab Assistant, University of Missouri – Columbia

Undergraduate Mentoring

- 2012 – present Mentor to Tracy Zander, Stephanie Zhang, Courtney Sciarrata, Matthew Greg, Regan O’Hanlon, Saint Louis University
2012 – present PlantingScience Master Plant Science Team Mentor Liaison

Courses as high school instructor

- 2009 – 2010 General, Pre-AP, Advanced Placement Biology, Central High School, Helena, AR
2008 – 2009 General and Pre-Advanced Placement Biology, Central High School, Helena, AR
2007 – 2008 General Biology, Central High School, Helena, AR

OTHER EXPERIENCE

Field Work

- 2014 – 2015 China (Yunnan)
2013 – 2014 China (Yunnan); United States (Missouri)
2012 – 2013 United States (Missouri, Ohio, Kentucky)
2011 – 2012 United States (West Virginia, Kentucky, Pennsylvania, Ohio, Michigan, Indiana, Arkansas, Mississippi, Missouri)
2010 – 2011 United States (Missouri)

Science Policy

- 2015 Congressional Districts Visits Day, St. Louis, MO; organized a tour of the Missouri Botanical Garden herbarium for Missouri State Senator Jamilah Nasheed
2015 Botanical Society of America Public Policy Committee Member
2014 Congressional Visits Day, Washington, D.C.; held meetings with members from the offices of Senators and Representatives from Missouri and Kentucky

SERVICE

Service to societies and institutions

- 2015 Botanical Society of America Public Policy Committee Member
2015 PlantingScience Master Plant Science Team Mentor Liaison
2015 Maryville University Junior Science, Engineering & Humanities Symposium oral presentation judge
2014 PlantingScience Master Plant Science Team Mentor Liaison
2014 Maryville University Junior Science, Engineering & Humanities Symposium poster and oral presentation judge
2013 PlantingScience Master Plant Science Team Mentor Liaison
2013 Delivered a lesson on invasive species, extinction, and genetics to fifth and sixth graders at Saint Joseph Middle School, Imperial, MO
2012 PlantingScience Master Plant Science Team Mentor Liaison
2011 Saint Louis University Graduate Student Orientation Volunteer Panel Member for session entitled “‘I think one of my students is cheating...’: How to help prevent cheating and what to do when it happens.”
2011 Assisted with translation of Herbarium Tags, Missouri Botanical Gardens
2011 Saint Margaret of Scotland Science Fair Judge
2010 Humane Society of the Delta Volunteer
2010 ACT Tutor Volunteer
2009 Arkansas Delta Blues and Heritage Festival Chairman
2008 Secretary, Central High School Leadership Team

- 2007 Central High School Assistant Baseball Coach (three seasons)
 2003 University Hospital, Child Life Volunteer
 2003 Secretary, Tri Beta Biological Honors Society

Manuscript Editing

- Yang, Y. and S.-L. He. 2016. MaxEnt-based predictions of potential distributions of wild alpine *Meconopsis* Vig. species. *In preparation*.
- Li, H.-D. and H. Wang. 2016. Character displacement in floral traits between allopatric and sympatric populations of distylous *Primula* (Primulaceae) species. *Submitted to Annals of Botany*.
- Shi, Y.-T., J. Guo, G.-B. Yao, Y.-Z. Wang, H. Yang, Y.-S. Chen, and H.-B. Zhang. 2016. Effects of modifying the soil microbe community on seedling reestablishment and growth of the invasive plant *Ageratina adenophora* (Crofton weed). *Resubmitted to Applied Soil Ecology*.
- Jiang, W., H.-J. He, D.-Z. Li, M.-Q. Yang, and H. Wang. 2016. Pollen evolution in Cucurbitaceae. *Resubmitted to the Journal of Systematics and Evolution*.
- Yang, L., P.-F. Ma, H.-T. Li, J.-B. Yang, H. Wang, and D.-Z. Li. 2016. Plastid phylogenomic analyses resolve Tofieldiaceae as the root of the early diverging monocot order Alismatales. *Genome Biology and Evolution*.
- Liu, M.-L. and W.-B. Yu. 2015. A new species of *Pedicularis* (Orobanchaceae) from Gaoligong Mountains in Yunnan, southwestern China. *Phytotaxa* 217: 53-62.
- Liu, M.-L., W.-B. Yu, P. Kuss, D.-Z. Li, and H. Wang. 2015. Floral nectary morphology and evolution in *Pedicularis* (Orobanchaceae). *Botanical Journal of Linnean Society* 178: 592-607.
- Zhou, W., D.-Z. Li, and H. Wang. 2015. Patterns of floral variation between dimorphic and monomorphic populations coincide with the transition of mating patterns in distylous species: *Luculia pinceana* (Rubiaceae). *Plant Diversity and Resources* 37: 513-521.
- Zhang, D.-Z., L. Mei, H.-Y. He, Y.-C. Wang, A.-J. Cao, J. Guo, Y.-Z. Wang, M.-Z. Yang, and H.-B. Zhang. 2014. Study of factors for cultivating the orchid species *Gastrodia elata*, a traditional Chinese medicine. *Plant Diversity and Resources* 36: 254-260.
- Zhang, L.-N., X.-Z. Zhang, Y.-X. Zhang, C.-X. Zeng, P.-F. Ma, L. Zhao, Z.-H. Guo, and D.-Z. Li. 2014. Identification of putative orthologous genes for the phylogenetic reconstruction of temperate woody bamboos (Poaceae: Bambusoideae). *Molecular Ecology Resources*: doi: 10.1111/1755-0998.12248.

Journal Reviews

- Biological Invasions (1 review)

PROFESSIONAL SOCIETIES

- Botanical Society of America
 Citizen Science Association
 Torrey Botanical Society
 Sigma Xi

MEDIA COVERAGE

- Featured on In Defense of Plants podcast, Episode 30 – Kudzu. 11 October 2015.
<http://www.indefenseofplants.com/podcast/2015/10/11/ep-30-kudzu>
- Saint Louis University. “Biology Graduate Student Publishes Research on Invasive Kudzu Plant.” 03 June 2015. <http://www.slu.edu/x105932.xml>
- St. Louis Post-Dispatch. “Research on ‘vine that ate the South’ is underway near Imperial.” 31 August 2013. http://www.stltoday.com/news/local/metro/research-on-vine-that-ate-the-south-is-under-way/article_b99b6cbb-0f57-54e2-8ae3-c8ce869828a8.html

REFERENCES

Allison Miller
amille75@slu.edu
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Jason Knouft
jknouft@slu.edu
314-977-7654

Thomas Valone
valone@slu.edu
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Peter Bernhardt
bernhap2@slu.edu
314-977-4090

Christy Edwards
christy.edwards@mobot.org
314-577-9473 x6244

PhD Advisor. Plant evolution, ecology, population genomics; project design, development, management; molecular/field work; experimental design and data analysis; grant/publication writing; collaboration, teaching, student mentoring

PhD Committee Member. Niche theory, ecology, invasive species; GIS modeling and niche analyses; project development and experimental design

PhD Committee Member. Invasion and conservation biology and ecology; project development and experimental design; data analysis; grant/publication writing

PhD Committee Member and Collaborator. Pollination ecology; experimental design and data analysis; pollination lab and field techniques; international collaboration; publication writing

Collaborator. Population genetics; genomics; plant conservation; project design and development; grant writing