SUSAN C. ROBERTS
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EXECUTIVE SUMMARY:

First generation Ph.D. bio-chemical engineer with over 25 years of experience in academic leadership, research and training. Passions include encouraging faculty and student development to include emphasis on their individualized journeys; establishing and advancing interdisciplinary research activities at emerging interfaces; and, creating inclusive cultures where each person has a sense of belonging and value.

Began career at the University of Massachusetts at Amherst (UMass) as the first female faculty member, as well as the first faculty member to pursue Biochemical Engineering research in the UMass Department of Chemical Engineering. Became only the third female promoted to full professor in the College of Engineering. Established a world-renowned research program in plant cell engineering and biotechnology while at UMass. Started the interdisciplinary Institute for Cellular Engineering (ICE) as its inaugural director. Developed novel curricula at the interface of engineering and life sciences. Innovated graduate education in cellular engineering. Became first Associate Dean of the Graduate School. Tasked with co-creating the Office of Professional Development and designing individual development plans (IDP) for graduate students university wide.

Became Department Head of Chemical Engineering in 2015 at Worcester Polytechnic Institute (WPI). Helped in creating a thriving, inclusive culture for all faculty (18), staff (4) and students (300). Hired half of the department faculty. Tripled the size of the graduate program. Raised the research profile and funding levels. Successfully advocated for the promotion of all associate professors through an NSF ADVANCE award. Developed leadership, mentoring and advocacy structures at WPI for marginalized faculty.

EDUCATION:

1998	Cornell University, Ithaca, NY Ph.D., Chemical Engineering; minor in Biochemistry; Advisor: Michael L. Shuler Thesis: Engineering metabolism (biosynthesis, release, degradation) in plant cell tissue cultures for optimizing production of the anti-cancer agent Taxol®
1992	Worcester Polytechnic Institute, Worcester, MA B.S., Chemical Engineering with high distinction; concentration in Biomedical Engineering

PROFESSIONAL APPOINTMENTS:

2015-present	*Department Head*, Chemical Engineering, Worcester Polytechnic Institute
2015-present	*Professor*, Chemical Engineering, Worcester Polytechnic Institute
2013-2015	*Associate Dean*, Graduate School, University of Massachusetts Amherst
2005-2015	*Director*, Institute for Cellular Engineering, University of Massachusetts Amherst
2012-2015	*Professor*, Department of Chemical Engineering, University of Massachusetts Amherst
2005-2012	*Associate Professor*, Department of Chemical Engineering, University of Massachusetts Amherst
1998-2005	*Assistant Professor*, Department of Chemical Engineering, University of Massachusetts Amherst
1992-1998	*Graduate Research Assistant*, Department of Chemical & Biomolecular Engineering, Cornell University, Ithaca, NY
1991-1992	*Research Assistant*, Drug Delivery Group, Genetics Institute, Andover, MA (summers)

LEADERSHIP AND ADMINISTRATIVE ACCOMPLISHMENTS (SELECTED): Many individuals including faculty, students, staff and external partners helped tremendously with these accomplishments!

Department Head of Chemical Engineering, WPI (2015-2025)

- Hired seven professors (one chaired full professor, four assistant dual mission tenure track, one associate dual mission tenure track and one assistant teaching mission tenure track with Environmental Engineering) who have won teaching and research awards and procured approximately $18M in funding, including two NSF Career Awards.
- Strengthened the Graduate Program in Chemical Engineering at WPI. Revamped the Graduate Committee, developed new recruiting strategies, established a professional MS Program, and grew the BS/MS Program through innovative curricula design. The Doctoral student population has increased in both quality and number (two-fold increase to 30 students annually). The MS Program (thesis, professional, and course-based) has increased six-fold (from approximately five students to 30 students annually), enabling the department to procure additional resources and secure new TA lines.
- Established a diverse academic environment in Chemical Engineering at WPI. Hired four female faculty to bring the departmental percentage of female faculty to 45% (seven TTT). Female undergraduates, doctoral and MS students represent approximately 50% of the total population in all categories. New efforts are underway to increase underrepresented minority populations at all levels, including the recent establishment of a new Sustainable Inclusive Excellence (SIE) initiative in the Department, and deployment of targeted recruiting strategies.
- Developed a new departmental academic retreat model to examine the curricula through a lens of aligning activities with learning outcomes, creating a culture of inclusivity, prioritizing work, "pruning" unnecessary activities and technical content, and adding resiliency training. The COVID pandemic highlighted the need for attention to the mental health of our community through promotion of an empathetic culture and connectedness. This model was disseminated to all departments and programs at WPI.
- Created a supportive university and departmental culture that promotes equity and enables all citizens to be successful in their academic and career goals. Much of my efforts have been focused on the faculty level. Through the ADVANCE grant, I co-developed a new model for Faculty Annual Reviews that shifted the process from evaluative to conversational, allowing each faculty member to express their proudest accomplishments, which dream projects they would like to pursue, and how I can best support them in their efforts. This new model has been embraced by the entire WPI academic community and is now being used by all department heads and program directors. WPI Chemical Engineering is ranked 1st for all WPI departments in departmental collegiality, leadership and culture (as quantified by the COACHE survey, 2021).
- Fundraised close to $1.5M to support WPI's Chemical Engineering Graduate Program by working closely with Advancement and engaging key alumni. These funds are used to support doctoral fellowships and provide recruiting bonuses to strengthen the doctoral pool.
- Established a new model for associate professor mentoring at WPI and beyond with funding from NSF ADVANCE and the WPI Women's Impact Network. Significant effort was initially directed towards developing a Professional Development Plan (PDP) template that can be utilized by associate professors. The document includes sections that allow faculty to explore their values and interests, assess their skills and deficiencies, set long-term goals for their careers, create short-term goals and timelines relevant to their promotion, analyze their goals in an institutional and departmental context, and establish mentoring networks to create a team of advocates both within and outside of the institution. We hold annual workshops for new associate professors (that have yet to develop a plan) and refresher workshops for associate professors to assess and evolve their plans. We also established a structure for each associate professor to create their own "mentoring team" that consists of two faculty members along with their department head (voted unanimously by the faculty to be codified in the Faculty Handbook). Since 2017, there has been a quadrupling of women promoted to full professor at WPI. In STEM, women faculty success rates for promotion increased from 43 to 75%, while men faculty success rates stayed relatively constant (79 to 85%). In 2017, the percentage of women TT full profes-

sors was 18%; today this percentage is 24%! These efforts were awarded with the NIH Diversity Prize in Biomedical Sciences in 2021.

- Advocated (through working with administration and the VP for Campus Planning and Facilities Management) for a $9M renovation of Goddard Hall (which houses Chemical Engineering main offices, teaching labs and catalysis/materials faculty), 4,000 additional sq ft in research space in Goddard Hall and the Interdisciplinary Life Sciences Building (LSB), and conversion of computational teaching space to graduate student office space in Goddard Hall.
- Launched a new interdisciplinary doctoral recruiting approach at WPI that has expanded to include all STEM departments and programs and over 100 students annually. Most doctoral programs at WPI admit less than 10 students annually, making it difficult to hold robust on-campus recruiting days. Through careful coordination supported by the Graduate School, prospective students from 12 STEM departments and programs across the university are invited for an interdisciplinary program that involves both larger group activities (overview of the graduate school, description of campus facilities, highlight of interdisciplinary research initiatives including NSF NRT programs, interdisciplinary poster session) and departmental/program activities (overview of departmental research and degree requirements, meeting with faculty and students, laboratory tours and social events). The University has increased their doctoral population and quality of students through the institution of this annual event.
- Co-led COVID-19 recovery and relief efforts on campus by developing a model to support equity in faculty career advancement during and after the COVID-19 pandemic. Raised $143,000 in funds which were distributed to 65% of WPI women assistant professors, 22% of WPI women associate professors and 18% of WPI women teaching professors. Mini-grants were used individually to support a variety of activities including research assistants, course releases, supplies, conference travel, childcare and editing. We were awarded honorable mention in the NSF Taking Action: COVID-19 Diversity, Equity, and Inclusion Challenge (2022).
- Initiated mutual mentoring groups for female faculty at WPI to combat isolation and to foster career advancement, satisfaction and retention. Ultimately, five groups of approximately 10 faculty each were created and continue to operate autonomously. This program was modeled after that described in the book "Every Other Thursday" by Ellen Daniell, which describes a successful group of female scientists from UC Berkeley, UCSF and other institutions in the Bay area that met regularly for 30 years to work together on both professional and personal issues. This approach can be applied to any group of faculty, students or staff that have a common identity.

Associate Dean of the Graduate School, UMass Amherst (2013-2015)

- Increased external funding for STEM students at UMass Amherst by establishing a new NSF Graduate Research Fellowship Program (GRFP) Application initiative, educating postdocs and graduate students on submitting NIH F30/31/32 applications, and identifying and assisting new faculty groups in applying for and procuring new institutional training grant programs such as those offered through the NIH and NSF. Many of these activities were subsequently implemented at WPI.
- Co-established the new Graduate School Office of Professional Development, which now offers over 400 workshops annually in career preparation, teaching, personal development, communication and grants and fellowships (https://www.umass.edu/graduate/professional-development).
- Designed and implemented a universal Individual Development Plan (IDP) template and program for all doctoral students at UMass Amherst, to comply with federal requirements. IDPs provide both a planning process to identify professional development needs and career objectives, and a communication tool between graduate student and advisor(s).

Director of the Institute for Cellular Engineering, UMass Amherst (2005-2015)

- Founded the Institute for Cellular Engineering (ICE) at UMass Amherst through a $150,000 UMass President's Science and Technology (S&T) Initiatives award and served as director to address research and educa-

tional challenges and opportunities at the interface of engineering and life sciences. Fourteen programs, 60 faculty and over 200 graduate students across three colleges participated in ICE activities.

- Raised over $5M in funding for training (NSF IGERT Program, NSF REU Program), research (collaborative grants and invited for a full proposal to the NSF S&T Program) and facilities (NSF MRI and industry).
- Started a graduate certificate program in Cellular Engineering, where graduate students could earn credentials for completing courses, laboratory modules and professional development activities.
- Procured an NIH T32 PhD training grant (with B. Osborne), which served as the seed for the Cellular Engineering Biotechnology Training Program at UMass Amherst (https://btp.umass.edu/), which continues to this day through sustained NIH funding.
- Procured a $1M donation of a unique plant cell culture library and related equipment from Monsanto Company. Transferred the >1,000 species to UMass Amherst and established infrastructure to enable continued operation and accessibility by the community (https://www.umass.edu/ials/pccl-database).

AWARDS AND HONORS:

- NSF Taking Action: COVID-19 Diversity, Equity, and Inclusion Challenge, WPI honorable mention (2022)
- NIH Diversity Prize in Biomedical Sciences (2021)
- NSF ADVANCE Adaptation Grant (2018)
- President's Science and Technology Fund Award (2014)
- Exceptional Merit Award, UMass Amherst Provost's Office (2012)
- Commercial Ventures and Intellectual Property Technology Development Fund Award (2010)
- Outstanding Teaching Award, UMass College of Engineering (2010)
- Selected as participant for the first National Academy of Engineering Frontiers in Engineering Education Workshop (2009)
- Research Leadership in Action Award, UMass Office of the Vice Provost (2006)
- Selection as Faculty Ambassador, UMass Amherst (2006)
- Outstanding Junior Faculty Award, UMass College of Engineering (2003)
- Selection as Engineering Faculty Commencement Speaker (2002)
- Minority in Engineering Program Recognition Award, UMass College of Engineering (2002)
- Women in Engineering Program Recognition Award, UMass College of Engineering (2001)
- UMass ChE Department "Celebration for Teaching" Awardee (2001)
- CAREER Award, National Science Foundation (2000)
- Outstanding Advisor Service Award, UMass College of Engineering (2000)
- AAUW Educational Foundation Engineering Dissertation Fellowship (1996-97)
- Head TA Fellow for College of Engineering TA Development, Cornell University (1995-97)
- Department of Defense ASEE Graduate Research Fellowship (1993-96)
- Whitaker Foundation Graduate Fellowship (1993, declined)
- WPI Provost's Major Qualifying Project Award for Most Outstanding Senior Research Project (1992)
- AIChE Most Outstanding Senior Student Award (1992)
- American Institute of Chemists (AIC) Annual Achievement Award (1992)
- Boston Chapter AIChE Scholarship Award (1991)
- WPI Two Towers Prize – Most Outstanding Junior Student at WPI (1991)
- Tau Beta Pi and Phi Lambda Upsilon honor societies

PUBLICATIONS:

Peer-Reviewed Articles (* indicates corresponding author)

1. Newton, C.B., McKee, M.C., Harrison, A.M., Revene, L.D., Young, E.M., Roberts*, S.C. (2025) "Metabolic engineering of *Taxus chinensis* suspension cell cultures reveal insights into pathway regulation for paclitaxel production," *Metabolic Engineering*, in preparation.
2. Newton, C.B., Young, E.M., Roberts*, S.C. (2025) "Reactivation of epigenetically silenced metabolic path-

ways in continuously subcultured *Taxus* plant cell lines," *Biotechnology and Bioengineering*, submitted.

3. Newton, C.B., Young, E.M., Roberts*, S.C. (2023) "Targeted control of supporting pathways in paclitaxel biosynthesis with CRISPR-guided methylation," *Frontiers in Bioengineering and Biotechnology*, 11, 1272811. DOI: 10.3389/fbioe.2023.1272811
4. McKee, M.C., Wilson, S.A., Roberts*, S.C. (2021) "The interface amongst conserved and specialized pathways in non-paclitaxel and paclitaxel accumulating *Taxus* cultures," *Metabolites*, 11(10), 688. DOI: 10.3390/metab1100688
5. Wilson, S.A., Maindarkar, Shashank, N., McKee, M.C., Vilkhovoy, M., Henson, M.A., Roberts*, S.C. (2020) "A population balance model to modulate shear for the control of aggregation in *Taxus* suspension cultures," *Biotechnology Progress*, 36(2). DOI: 10.1002/btpr.2932
6. Wilson, S.A., Keen, P., McKee, M.C., Raia, N., Van Eck, J., and Roberts*, S.C. (2018) "Development of an Agrobacterium-mediated transformation method for *Taxus* suspension cultures," *In Vitro Cellular and Developmental Biology – Plant*, 54(1), 36-44. DOI: 10.1007/S11627-017-9876-8
7. Lenka, S.K., Nims, E., Vongaseuth, K., Boshar, R.A., Roberts, S.C., and Walker*, E.L. (2015) "Jasmonate-responsive expression of paclitaxel biosynthesis genes in *Taxus cuspidata* cultured cells is negatively regulated by the bHLH transcription factors TcJAMYC1, TcJAMYC2, and TcJAMYC4," *Frontiers in Plant Science*, Feb 26;6:115. DOI: 10.3389/fpls.2015.00115. eCollection 2015.
8. Wilson, S.A., Cummings, E.M., and Roberts*, S.C. (2014) "Multi-scale engineering of plant cell cultures for promotion of specialized metabolism," *Current Opinion in Biotechnology*, Oct;29C:163-170. DOI: 10.1016/j.copbio.2014.07.001
9. Wilson, S.A., and Roberts*, S.C. (2014) "Metabolic engineering approaches for production of biochemical in food and medicinal plants," *Current Opinion in Biotechnology*, 26: 174-182. DOI: 10.1016/j.copbio.2014.01.006
10. Patil, R.A., Lenka, S.K., Normanly, J., Walker, E.L., and Roberts*, S.C. (2014) "Methyl jasmonate represses growth and affects cell cycle progression in cultured *Taxus* cells," *Plant Cell Reports*, 33(9): 1479-1492. DOI: 10.1007/s00299-014-1632-5
11. Stoppel, W. L., White, J. C., Horava, S. D., Henry, A. C., Roberts, S. C., Bhatia*, S. R. (2014) "Terminal sterilization of alginate hydrogels: Efficacy and impact on mechanical properties," *Journal of Biomedical Materials Research Part B: Applied Biomaterials*, 102(4): 877-884. DOI: 10.1002/jbm.b.33070
12. Patil, R.A., Kolewe, M.E., and Roberts*, S.C. (2013) "Cellular aggregation is a key parameter associated with long term variability in paclitaxel accumulation in *Taxus* suspension culture," *Plant Cell Tissue and Organ Culture*, 112(3): 303-310. DOI: 10.1007/s11240-012-0237-3
13. White, J.C., Stoppel, W.L., Roberts, S.C., and Bhatia*, S.R. (2013) "Addition of perflurocarbons to alginate hydrogels significantly impacts molecular transport and fracture stress," *Journal of Biomedical Materials Research Part A*, 101(2): 438-446. DOI: 10.1002/jbm.a.34344
14. McPartland, T.J., Patil, R.A., Malone, M.F., and Roberts*, S.C. (2012) "Liquid-liquid extraction for recovery of paclitaxel from plant cell culture: Solvent evaluation for partitioning and selectivity and utilization of reactive agents," *Biotechnology Progress*, 28(4): 990-997. DOI: 10.1002/btpr.1562. PMID: 22581674
15. Lenka, S.K., Boutaoui, N., Paulose, B., Vongpaseuth, K., Normanly, J., Roberts, S.C., and Walker*, E.L. (2012) "Identification and expression analysis of methyl jasmonate responsive ESTs in paclitaxel producing *Taxus cuspidata* suspension culture cells," *BMC Genomics*, 13: 148. DOI: 10.1186/1471-2164-13-148
16. Naill, M., Kolewe, M.E., and Roberts*, S.C. (2012) "Paclitaxel uptake and transport in *Taxus* cell suspension cultures," *Biochemical Engineering Journal*, 63: 50-56. DOI: 10.1016/j.bej.2012.01.006
17. Patil, R.A., Kolewe, M.E., Normanly, J.N., Walker, E.L., and Roberts*, S.C. (2012) "Taxane biosynthetic pathway gene expression in *Taxus* suspension cultures with different bulk paclitaxel accumulation patterns – a molecular approach to understand variability in paclitaxel accumulation," *Biotechnology Journal*, 7(3): 418-27. DOI: 10.1002/biot.201100183
18. Wilson, S.A., and Roberts*, S.C. (2012) "Recent advances towards development and commercialization of plant cell culture processes for synthesis of biomolecules," *Plant Biotechnology Journal*, 10(3): 249-268. DOI: 10.1111/j.1467-7652.2011.00664.x

19. Kolewe, M.E., Roberts, S.C., and Henson*, M.A. (2012) "A population balance equation model of aggregation dynamics in *Taxus* suspension cell cultures," *Biotechnology and Bioengineering*, 109(2): 472-482. DOI: 10.1002/bit.23321
20. Stoppel, W.L, White, J.C., Horava, S.D., Bhatia, S.R., and Roberts*, S.C. (2011) "Transport of biological molecules in surfactant-alginate composite hydrogels," *Acta Biomaterialia*, 7(11): 3988-3998. DOI:10.1016/j.actbio.2011.07.009
21. Kolewe, M.E., Henson, M.A., and Roberts*, S.C. (2011) "Analysis of aggregate size as a process variable affecting paclitaxel accumulation in *Taxus* suspension cultures," *Biotechnology Progress*, 27(5):1365-1372. DOI: 10.1002/btpr.655
22. Gaurav, V., and Roberts*, S.C. (2011) "A statistical approach to optimize production of single cells from *Taxus cuspidata* plant cell aggregates for flow cytometry applications," *Preparative Biochemistry and Biotechnology*, 41(3): 219-235. DOI: 10.1080/10826068.2011.575261
23. Choudhary, S., White, J.C., Stoppel, W.L., Roberts, S.C., and Bhatia*, S.R. (2011) "Gelation behavior of polysaccharide-based interpenetrating polymer network (IPN) hydrogels," *Rheologica Acta*, 50(1): 39-52. DOI: 10.1007/s00397-010-0499-9
24. Kolewe, M. and Roberts*, S. (2010) "Plant natural products from cultured multipotent cells," *Nature Biotechnology*, 28(11): 1175-1176. DOI:10.1038/nbt1110-1175
25. Kolewe, M.E., Henson, M.A., and Roberts*, S.C. (2010) "Characterization of aggregate size in plant cell tissue culture," *Plant Cell Reports*, 29(5): 485-494. DOI: 10.1007/s00299-010-0837-5
26. Kolewe, M.E., Gaurav, V., and Roberts*, S.C. (2008) "Pharmaceutically-active natural product synthesis and supply via plant cell culture technology," *Molecular Pharmaceutics*, **5(2)**: 243-256. DOI: 10.1021/mp7001494
27. Chin, K., Khattak, S., Bhatia, S., and Roberts*, S.C. (2008) "Hydrogel-perfluorocarbon composite scaffold promotes oxygen transport to immobilized cells," *Biotechnology Progress*, **24**, 358-366. DOI: 10.1021/bp070160f
28. Roberts*, S.C. (2007) "Production and engineering of terpenoids from plant cell cultures," *Nature Chemical Biology*, **3**, 387-395. DOI: 10.1038/nchembio.2007.8
29. Vongpaseuth, K., Nims, E., StAmand, M., Walker, E.L., and Roberts*, S.C. (2007) "Development of a particle bombardment-mediated transient transformation system for *Taxus* spp. cells in culture," *Biotechnology Progress*, **23**. 1180-1185. DOI: 10.1021/bp0700307
30. Khattak, S.F., Chin, K.S., Bhatia, S.R., and Roberts*, S.C. (2007) "Enhancing oxygen tension and cellular function in alginate cell encapsulation devices through the use of perfluorocarbons," *Biotechnology and Bioengineering*, **96**: 156-166. DOI: 10.1002/bit.21151
31. Vongpaseuth, K., and Roberts*, S.C. (2007) "Advancements in the understanding of paclitaxel metabolism in tissue culture," *Current Pharmaceutical Biotechnology*, **8**, 219-236. DOI: 10.2174/138920107781387393
32. McEntee, M.K.E., Bhatia, S.K., Tao, L., Roberts, S.C., and Bhatia*, S.R. (2007) "Tunable transport of glucose through ionically-crosslinked alginate gels: Effect of alginate and calcium concentration," *Journal of Applied Polymer Science*, **107**, 2956-2962. DOI: 10.1002/app.27478
33. Nims, E., Dubois, C.P., Roberts*, S.C., and Walker, E.L. (2006) "Expression profiling of genes involved in paclitaxel biosynthesis for targeted metabolic engineering," *Metabolic Engineering*, **8**: 385-394. DOI: 10.1016/j.ymben.2006.04.001
34. Naill, M., and Roberts*, S.C. (2006) "Culture of isolated single cells from *Taxus* suspensions for the propagation of superior cell populations," *Biotechnology Letters*, **27(21)**: 1725-1730. DOI: 10.1007/s10529-005-2738-1
35. Khattak, S., Spatara, M., Roberts, L., and Roberts*, S.C. (2006) "Application of colorimetric assays to assess viability, growth and metabolism of hydrogel-encapsulated cells," *Biotechnology Letters*, **28(17)**: 1361-1370. DOI: 10.1007/s10529-006-9104-9
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37. Naill, M., and Roberts*, S.C. (2005) "Flow cytometric identification of paclitaxel accumulating subpopulations," *Biotechnology Progress*, **21**: 978-9834. DOI: 10.1021/bp049544l
38. Khattak, S., Bhatia, S.R., and Roberts*, S.C. (2005) "Pluronic F127® as a cell encapsulation material: Utilization of membrane stabilizing agents," *Tissue Engineering*, **11(5-6)**: 974-983. DOI:10.1089/ten.2005.11.974
39. Bhatia*, S.R., Khattak, S., and Roberts, S.C. (2005) "Polyelectrolytes for cell encapsulation," *Current Opinion in Colloid and Interface Science*, **10**: 45-51. DOI:10.1016/j.cocis.2005.05.004
40. Agrawal, S.K., Chin, K.S., Sanabria-Delong, N., Aamer, K.A., Sardinha, H., Tew, G.N., Roberts, S.C., and Bhatia*, S.R. (2005) "Rheology and biocompatibility of Poly(lactide)-poly(ethylene oxide)-poly(lactide) hydrogels," *Materials Research Society Symposium Proceedings,* **v. 844** – Mechanical Properties of Bio-Inspired and Biological Materials, 327-332. ISBN: 1-55899-792-X
41. Roberts*, S. (2005) "A successful introduction to chemical engineering first-semester course focusing on connection, communication and preparation" *Chemical Engineering Education*, **39(3)**: 222-227.
42. Naill, M., and Roberts*, S.C (2005) "Flow cytometric analysis of protein content in *Taxus* protoplasts and single cells as compared to aggregated suspension cultures," *Plant Cell Reports*, **23(8)**: 528-533. DOI: 10.1007/s00299-004-0875-y
43. Naill, M., and Roberts*, S.C. (2004) "Preparation of single cells from aggregated *Taxus* suspension cultures for population analysis," *Biotechnology and Bioengineering*, **86(7)**: 817-826. DOI: 10.1002/bit.20083
44. McAuliffe, G., Roberts, L.A., and Roberts*, S. (2003) "The influence of environmental conditions on the encapsulation of HepG2 liver cells in alginate," *JURIBE*, **3(1)**: 70-75.
45. Roberts*, S., Naill, M., Gibson, D., and Shuler, M. (2003) "A simple method for enhancing paclitaxel release from *Taxus canadensis* cell suspension cultures utilizing cell wall digesting enzymes," *Plant Cell Reports* **21:** 1217-1220. DOI: 10.1007/s00299-003-0575-z
46. McAuliffe, G., Roberts, L., and Roberts*, S. (2002) "Paclitaxel administration and its effects on clinically relevant human cancer and noncancer cell lines," *Biotechnology Letters* **24:** 959-964. DOI: 10.1023/A:1015629406774
47. Matthew, J., Nazario, Y., Roberts, S., and Bhatia*, S. (2002) "Effect of mammalian cell culture medium on the gelation properties of Pluronic®F127," *Biomaterials* **23:** 4615-4619. DOI:10.1016/S0142-9612(02)00208-9
48. Roberts, S., and Shuler*, M. (1997). "Large-scale plant cell culture," *Current Opinion in Biotechnology* **8**:154-159. DOI: 10.1016/S0958-1669(97)80094-8
49. Srinivasan, V., Roberts, S., and Shuler*, M. (1997) "Combined use of six-well polystyrene plates and thin layer chromatography for rapid development of optimal plant cell culture processes: Application to taxane production by *Taxus* sp.," *Plant Cell Reports* **16(9)**: 600-604. DOI: 10.1007/BF01275499
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51. Srinivasan, V., Pestchanker, L., Moser (Roberts), S., Hirasuna, T., Taticek, R., and Shuler*, M. (1995) "Taxol production in bioreactors: Kinetics of biomass accumulation, nutrient uptake, and Taxol production by cell suspensions of *Taxus baccata*," *Biotechnology and Bioengineering* **47**: 666-676. DOI: 10.1002/bit.260470607

Book Chapters (* indicates corresponding author)

1. Demetry, C., Lingo, E.L., Roberts, S.C., Skorinko, J., and Farny, N. (2024) "More than a Network: A Mid-Career Mentoring System that Values Meaningful Work" in: Breaking the Silence: Institutional Responsibility in Women's Promotion to Full Professor, Purdue University Press (invited chapter).
2. Brzycki, C.M., Young, E.M., and Roberts*, S.C. (2020) "Secondary Metabolite Production in Plant Cell Culture: A New Epigenetic Frontier" in: Exploring Plant Culture for the Production of Compounds of Interest, Edited by S. Malik. Elsevier.
3. Andrews, G.R. and Roberts*, S.C. (2017) "Bioprocess Engineering of Plant Cell Suspension Cultures" in: Applied Bioengineering: Innovations and Future Directions, First Edition. Edited by Toshiomi Yoshida. Wiley-VCH Verlag GmbH & Co. KGaA.

4. Leone, L., and Roberts*, S.C. (2013) "Accessing anticancer natural products by plant cell culture" in Natural Products and Cancer Therapy, Ed. Koehn, Springer, 193-211.
5. Patil, R.A., and Roberts*, S.C. (2012) "Implications of cellular heterogeneity on plant cell culture performance" in Biotechnology for Medicinal Plants, Eds. Chandra, S., Lata, H., and Varma, A., Springer, 207-239.
6. Stoppel, W.L., and Roberts*, S.C. (2011) "Oxygen supply for tissue engineering" in Engineering Biomaterials for Regenerative Medicine, Novel Technologies for Clinical Applications, Ed. S. Bhatia, Springer, 41-88.
7. Gaurav, V., Kolewe, M.E., and Roberts*, S.C. (2010) "Flow cytometric methods to investigate culture heterogeneities for plant metabolic engineering" in Plant Secondary Metabolism Engineering: Methods and Applications, Methods in Molecular Biology, Vol. 643, Ed. Fett-Neto, A., Springer, 243-262.
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Non-reviewed Published Abstracts and Proceedings

1. McKee, M, Hill, M., Hardy, J., Roberts, S. (2018) "Engineering the mammalian caspase to develop a novel selection system for paclitaxel-accumulating cells in *Taxus* plant cell culture," *In Vitro Cellular and Developmental Biology – Animal*, 54, S42-S43.
2. Roberts, S.C. (2017) "Quantifying heterogeneity in plant cell culture using flow cytometric methods," *In Vitro Cellular and Developmental Biology – Animal*, 53, S2.
3. McKee, M., Hill, M., Hardy, J., Roberts, S. (2017) "A novel approach to cell selection from *Taxus* plant cell culture via an engineered mammalian caspase," *In Vitro Cellular and Developmental Biology – Animal*, 53, S36.
4. Wilson, S.A., Vilkhovoy, M.V., Bevacqua, S.P., and Roberts, S.C. (2014) "Mechanical shearing *Taxus* plant suspension cultures reduces aggregation without affecting cell health," *Proceedings of the 40th Annual Northeast Bioengineering Conference*, Boston, MA.
5. Wilson, S.A., Keen, P., Walker, E., Van Eck, J., and Roberts, S.C. (2014) "Mapping of active secondary metabolic pathways in Taxus cell cultures for targeted metabolic engineering," *Abstracts of Papers of the American Chemical Society*, 247.
6. Van Eck, J., Keen, P., Wilson, S. Roberts, S.C. (2012) "Factors that affect the recovery of *Taxus* transgenic cell lines," *In Vitro Cellular and Developmental Biology – Animal*, 48, 57-58.
7. Kolewe, M., Roberts, S.C. (2009) "Plant cell culture: Sustainable production of bioactive natural products," *Abstracts of Papers of the American Chemical Society*, 238, 302.
8. Gaurav, V., Roberts, S.C. (2009) "Development of a live cell-based immunofluorescent assay for the detection of pharmaceutically relevant secondary metabolites in plant cells," *Abstracts of Papers of the American Chemical Society*, 237, 609.
9. Roberts, S., Passonno, S., and Bhatia, S. (2009) "Interdisciplinary Training in Cellular Engineering at UMass Amherst: The Institute for Cellular Engineering (ICE) REU Summer Site," *Proceedings of the IEEE: 35th Annual Northeast Bioengineering Conference*, 323-324.
10. Passonno, S., Bhatia, S., and Roberts, S. (2009) "Graduate Training in Cellular Engineering at UMass Amherst: The Institute for Cellular Engineering (ICE) IGERT Program at UMass Amherst," *Proceedings of the IEEE: 35th Annual Northeast Bioengineering Conference*, 268-269.
11. Nail, M.C., Roberts, S.C. (2003) "Investigating cell subpopulation dynamics of *Taxus* cell suspension cultures: A single cell method," *Abstracts of Papers of the American Chemical Society*, 225, U246.
12. Matthew, J., Bhatia, S. and Roberts, S. (2002) "Pluronic F127 gels as materials for mammalian cell encapsulation," *Polymer Preprints*, 43(2): 769-770.
13. Roberts, S., Roberts, L.A., and McAuliffe, G. (2001) "Paclitaxel metabolism by clinically relevant cell lines and its effects on cell metabolism *in vitro*," *FASEB*, 15(5): A919-A919, Part 2.
14. Roberts, S., and Fisher, R. (2000) "The role of transport phenomena on efficacy, stability and hysteresis in encapsulated cellular systems," *Proceedings of the IEEE 26th Annual Northeast Bioengineering Conference*, April 8-9: 21-22.
15. Roberts, S. (2000) "A successful introduction to chemical engineering first-semester course focusing on connection, communication and preparation," pp. 406-411. In: Millennium Topical Conference Proceedings from

the AIChE Annual Meeting 2000, Session T3009: Chemical Engineering in the Lower Levels.
16. Fisher, R., Roberts, S., Peattie, R, and Bronzino, J. (2000) "Characterization of a spinning cone contactor as a tissue engineering bioreactor," *Annals of Biomedical Engineering*, T12.38: S-123.
17. Fisher, R., Roberts, S., and Peattie, R. (2000) "Controlling tissue microenvironments with encapsulating membranes: Efficacy, stability and hysteresis," *Annals of Biomedical Engineering*, T12.39: S-123.
18. Fisher, R., Weiss, R., Roberts, S., Peattie, R., and Bronzino, J. (2000) "Evaluating encapsulation hydrogels for tissue engineering applications: Transport and property characterization studies," *Annals of Biomedical Engineering*, T2.58: S-23.
19. Roberts, S., Fisher, R, and Roberts, L. (2000) "Development of an *in vitro* cell culture system for the study of drug metabolism using encapsulation technologies: Paclitaxel as a model drug," *Annals of Biomedical Engineering*, T7.19: S-82.
20. Ghanem, A., and Roberts, S. (1999) "Group self-assessment surveys as a tool to improve teamwork," *29th ASEE/IEEE Frontiers in Education Conference*, 11a2: 24.
21. Roberts, S., Hollar, K., and V. Carlson (1997). "Looking back: Lessons learned from ten years of training teaching assistants," *Proceedings of the ASEE Annual Conference*.

PRESENTATIONS:

Invited Talks, Seminars and Panels

1. Northeastern University, Department of Chemical Engineering, Boston, MA (November 2025)
2. Bioinnovation Group (BIG) Executive Summit, panelist and leadership session (October 2025)
3. University of South Florida, Department of Chemical and Biomedical Engineering, Tampa, FL (April 2022)
4. NIH Invited Panelist "Effective Approaches for Fostering Faculty Gender Diversity" (October 2021)
5. University of South Florida, Department of Chemical and Biomedical Engineering, Tampa, FL, virtual seminar (March 2020)
6. Northeastern University, Department of Chemical Engineering, Boston, MA (February 2020)
7. Small Molecules in Plant Research: Chemistry and Biology Come Together, Institute of Plant Molecular and Cell Biology, IBMCP, Valencia, Spain (December 2019)
8. Plant Metabolic Engineering Gordon Conference, Il Ciocco, Italy (June 2019)
9. Stevens Institute of Technology, Department of Chemical Engineering and Materials Science, Hoboken, NJ (November 2018)
10. WPI Women's Welcome Dinner, Keynote Speaker, Worcester, MA (August 2017)
11. Society of In Vitro Biology Annual Meeting, Raleigh, NC (June 2017)
12. AIChE Northeast Regional Meeting, Trends in the Biopharmaceutical Industry, Worcester, MA (March 2017)
13. BETC Advanced Biomanufacturing Symposium, Worcester, MA (April 2016)
14. Bioprocess International, Boston, MA (October 2016)
15. NRSDEC, Natick Laboratories, Natick, MA (October 2016)
16. Monsanto, Woodlands, CA (May 2014)
17. Colorado State University, Department of Chemical and Biology Engineering, Fort Collins, CO (April 2014)
18. American Council for Medicinally Active Plants (ACMAP), Annual Meeting, Amherst, MA (June 2013)
19. Plant Systems Biology Workshop, NSF-sponsored, invite only, Raleigh, NC (November 2012)
20. Cornell University, Department of Chemical and Biomolecular Engineering, Ithaca, NY (April 2012)
21. Progress in Biotechnology Series, UC Davis (October 2011)
22. Society of Industrial Microbiology Annual Meeting, New Orleans, LA (July 2011)
23. First Annual Conference of the American Council for Medicinally Active Plants (ACMAP), New Brunswick, NJ (July 2010)
24. National Academy of Engineering Frontiers in Engineering Education Workshop (November 2009)
25. HHMI-NIH Graduate Training Program Workshop, Panel on Building an Interdisciplinary Community, HHMI Conference Center, Chevy Chase, MD (September 2009)
26. Bioactives: New Production Technologies, ACS National Meeting, Washington D.C. (August 2009)
27. Biochemical Engineering XVI, Burlington, VT (July 2009)
28. Rensselaer Polytechnic Institute, Department of Chemical and Biological Engineering, Troy, NY (June 2009)

29. Path of Professorship, Massachusetts Institute of Technology, Cambridge, MA (October 2008)
30. The Coulter Principle: Foundations and Advanced Applications, Harvard Medical School, Boston, MA (October 2008)
31. Optimizing Cell Culture Development, Cambridge Healthcare Institute, Boston, MA (September 2008)
32. Bioorganic Chemistry Gordon Conference, Andover, NH (June 2008)
33. Preparing STEM Workforce for the Commonwealth, Amherst, MA (June 2008)
34. UMass Amherst, Medical Device Conference, Polymer Science & Engineering, Amherst, MA (May 2008)
35. University of Delaware, Chemistry-Biology Interface Program, Newark, DE (September 2007)
36. Dartmouth College, Thayer School of Engineering, Hannover, NH (April 2007)
37. Mt. Holyoke College, Leadership and Career Conference, South Hadley, MA (February 2006)
38. UMass Amherst, Third Annual Symposium in Plant Biology (October 2005)
39. UMass Amherst, First Annual Cellular Engineering Symposium (May 2005)
40. Exelixis Plant Sciences, Portland, OR (February 2005)
41. Interagency Conference on Metabolic Engineering, Interagency Metabolic Engineering Working Group (NSF, NIH, DOE, DOD, USDA, NIST, NASA, EPA), National Science Foundation (February 2005)
42. Texas A&M University, Department of Chemical Engineering, College Station, TX (December 2004)
43. UMass Amherst, Department of Exercise Science, Amherst, MA (April 2004)
44. UMass Amherst, Department of Plant and Soil Sciences, Amherst, MA (March 2004)
45. UMass Amherst-UCSB, Process Design Center Consortium, Santa Barbara, CA (June 2003)
46. Biophex 2002 Conference and Exhibition for Biopharmaceutical R&D, Processing & Manufacturing, San Jose, CA (October 2002)
47. UMass Amherst, Department of Polymer Science and Engineering, CUMIRP Meeting, Amherst, MA (May 2002)
48. Syracuse University, Department of Chemical Engineering, Syracuse, MA (April 2002)
49. University of Delaware, Department of Chemical Engineering, Newark, DE (February 2002)
50. Worcester Polytechnic Institute, AIChE meeting, Worcester, MA (March 2001)
51. Worcester Polytechnic Institute, Department of Biotechnology, Worcester, MA (November 2000)
52. UMass Amherst, Department of Chemistry, Amherst, MA (September 2000)
53. UMass Medical Center, Worcester, MA (April 2000)
54. Baystate Medical Center, Springfield, MA (December 1999)
55. UMass Amherst, Plant Biology Graduate Program, Amherst, MA (September 1998)
56. Cereon Genomics, Cambridge, MA (March 1998)

Contributed to National/International Meetings (* indicates speaker)

1. Sassano*, A., Newton, C.B., and Roberts, S.C., "Establishing Medicinal Plant Cell Lines for the Production of Anticancer Agents" (Protocol and 2023 data), SIVB Annual Meeting (2024), St. Louis, MO.
2. Rahi*, M.T., Roberts, S.C. "Transcriptomic analysis of *Taxus* species provides insights for engineering strategies to enhance secondary metabolite production" International mRNA Technology Conference (2024), Boston, MA (poster).
3. Sassano*, A., Newton, C.B., and Roberts, S.C., "Establishing Medicinal Plant Cell Lines for the Production of Anticancer Agents" (Protocol and updated 2024 data), AIChE Annual Meeting (2024), San Diego, CA.
4. Skorinko*, J., Demetry, C., Lingo, E.L., Roberts, S.C., Farny, N., and Hollan, K. "What is valued and who is valued for promotion to full? A case study of institutional change toward gender equity," European Association of Social Psychology, June 30 – July 4, 2023, Krakow, Poland.
5. Demetry*, C., Farny, N., Hollan, K.S., Lingo, E.L., Roberts, S.C., and Skorinko, J. "Summer working groups: A strategy to engage multi-level stakeholders in cross-cutting efforts that advance equity in STEM" Experience Report, Equity in STEM Community Convening, May 31 – June 3, 2022, Washington, D.C.
6. Lingo*, E.L. and Roberts, S. C. "Re-imagining the role of department heads as integrative creative leaders in the time of COVID: Catalyzing equity and innovation" Equity in STEM Community Convening, May 31-June 3, 2022, Washington, D.C.
7. Sassano*, A. and Roberts, S.C. "Developing and Validating a Cryopreservation Protocol for *Taxus chinen-*

sis plant cells" OSTEM Annual Meeting (2022), Boston, MA (poster).

8. Newton*, C.B., Harrison, A., Revene, L., Gandhi, J., Horton, S., Young, E.M., and Roberts, S.C. "Metabolic engineering enables concerted activation of paclitaxel biosynthesis in *Taxus* plant cell culture" AIChE Annual Meeting (2022), Phoenix, AZ.
9. Rahi*, M.T., Roberts, S.C. "Functional Characterization of Paclitaxel Transport in *Taxus cuspidata* to enhance secretion" AIChE Annual Meeting (2022), Phoenix, AZ (poster).
10. Newton*, C.B., Mazzoni, G., Young, E.M., and Roberts, S.C. "Treatment with global DNA demethylating agent 5-azacytidine results in concerted activation of paclitaxel biosynthesis in *Taxus* plant cell culture" Plant Biology Annual Meeting (2022), Portland, OR.
11. Brzycki*, C., Lenka, S., Harley, M., Yang, H., Young, E.M., and Roberts, S.C. "Transcriptome-guided mining and functional characterization of paclitaxel transporters in *Taxus* plant cell culture" AIChE Annual Meeting (2021), Boston, MA (poster).
12. Brzycki*, C., Gamache, M., Mazzoni, G., Whittles, E., Young, E.M., and Roberts, S.C. "Exploration of epigenetic regulation and development of global and targeted epigenetic engineering tools for *Taxus* plant cell culture" AIChE Annual Meeting (2021), Boston, MA.
13. Harrison*, A., Revene, L., Gandhi, J., Horton, S., Brzycki, C., and Roberts, S.C. "Metabolic pathway engineering of paclitaxel biosynthesis in *Taxus chinensis* plant cell culture" AIChE Annual Meeting (2021), Boston, MA (poster).
14. Dinicu*, A., Brzycki, C., and Roberts, S.C. "Effect of shear stress on secondary metabolite production in *Taxus* plant cell culture" AIChE Annual Meeting (2021), Boston, MA (poster).
15. Roberts*, S.C. "Exploring Graduate Opportunities at WPI" AIChE Annual Meeting (2021), Boston, MA
16. Demetry*, C., Farny, N., Lingo, E.L., Roberts, S.C., and Skorinko, J. "How is one University Transforming the Associate-to-Full Promotion for Gender Equity?" ADVANCE Resource and Coordination (ARC) Network Equity in STEM Community Convening (2019), Cleveland, OH (poster).
17. Demetry*, C., Farny, N., Lingo, E.L., Roberts, S.C., and Skorinko, J. "Transforming Faculty Promotion Systems for Inclusion and Equity" POD Network Annual Conference (2019), Pittsburgh, PA (poster).
18. Cummings Bende*, E.M., Lundgren, Upton, K.P., and Roberts, S.C. "Elucidating and engineering the role of arabinogalactan proteins in somatic embryogenesis" Graduate Research Innovation Exchange (2017), Worcester, MA (selected as finalist).
19. Cummings Bende*, E.M., Messier, R.J., Wilson, S.A., and Roberts, S.C. "New approaches in engineering somatic embryogenesis in loblolly pine suspension cultures" AIChE Annual Meeting (2017), Minneapolis, MN.
20. Cummings Bende*, E.M., and Roberts, S.C. "Elucidating and engineering the role of arabinogalactan proteins in somatic embryogenesis" AIChE Annual Meeting (2017), Minneapolis, MN (poster).
21. Cummings Bende*, E.M., Messier, R.J., Feng, Y., Buddika Peiris, T., and Roberts, S.C. "Early stress activation via methyl jasmonate influences loblolly pine somatic embryo yield" AIChE Annual Meeting (2017), Minneapolis, MN.
22. McKee*, M., Hill, M., Hardy, J., and Roberts, S.C. "Development of a selection system in Taxus plant cell culture to cull non-paclitaxel accumulating cells with an engineered mammalian caspase" Plant Metabolic Engineering Gordon Conference (2017), Waterville Valley, NH (poster).
23. McKee*, M., Hill, M., Hardy, J., and Roberts, S.C. "A novel approach to cell selection from Taxus plant cell culture via an engineered mammalian caspase" Society of In Vitro Biology Annual Meeting (2017), Raleigh, NC.
24. Cummings*, E.M., Lundgren, M.P., Upton, K.P., and Roberts, S.C. "Elucidating and engineering the role of arabinogalactan proteins in somatic embryogenesis" AIChE Annual Meeting (2016), San Francisco, CA.
25. Cummings*, E.M., Wilson, S.A., and Roberts, S.C. "New approaches in engineering somatic embryogenesis in loblolly pine suspension cultures" AIChE Annual Meeting (2016), San Francisco, CA (poster).
26. Andrews*, G.R., Henson, M.A., and Roberts, S.C. "Genome-scale model of a medicinal plant system" AIChE Annual Meeting (2016), San Francisco, CA.
27. Cummings*, E.M., and Roberts, S.C. "Impact of extracellular proteins and hormones on loblolly pine somatic embryogenesis" Northeast Section of the American Society of Plant Biology (NEASPB) Annual Confer-

ence (2016), Ithaca, NY (poster).

28. Andrews*, G.R., Henson, M.A., and Roberts, S.C. "Modeling of *Taxus* metabolism" Northeast Section of the American Society of Plant Biology (NEASPB) Annual Conference (2016), Ithaca, NY (poster).
29. McKee*, M., Hill, M., Hardy, H., and Roberts, S.C. Northeast Section of the American Society of Plant Biology (NEASPB) Annual Conference (2016), Ithaca, NY (poster).
30. McKee*, M., Hill, M., Hardy, J., and Roberts, S.C. American Society of Plant Biology Annual Meeting (2016), Austin, TX.
31. Wilson*, S.A., and Roberts, S.C. "Quantifying secondary metabolic pathway flux and time-dependent variation in plant suspension cultures" AIChE Annual Meeting (2014), Atlanta, GA.
32. Wilson*, S.A., and Roberts, S.C. "Modulating shear with a population balance equation model to sustain aggregate size distributions in plant cell culture" AIChE Annual Meeting (2014), Atlanta, GA.
33. Wilson*, S.A., and Roberts, S.C. "Multi-level engineering approaches for manipulating plant metabolism in culture" AIChE Annual Meeting (2014), Atlanta, GA (poster).
34. Wilson*, S.A., and Roberts, S.C. "Balancing flux through secondary metabolic pathways in plant culture systems" Metabolic Engineering X (2014), Vancouver, BC (poster, selected for rapid fire session).
35. Wilson*, S.A., and Roberts, S.C. "Mapping the distribution of flux through plant secondary metabolism" First International Workshop on Plant Synthetic Biology, MIT, Boston, MA (poster).
36. Wilson*, S.A., Vilkhovoy, M.V., Bevacqua, S.P., and Roberts, S.C. "Mechanical shearing *Taxus* plant suspension cultures reduces aggregation without affecting cell health" 40th Annual Northeast Bioengineering Conference (2014), Boston, MA (poster).
37. Wilson*, S.A., Keen, P., Normanly, J., Van Eck, J., Walker, E.L., and Roberts, S.C. "Mapping of active secondary metabolic pathways in *Taxus* cell cultures for targeted metabolic engineering" American Chemical Society Annual Meeting (2014), Dallas, TX.
38. Stoppel*, W.L., Hutchens, S.B., Crosby, A.J., and Roberts, S.C. "Cavitation microrheology: New tool to quantify mechanical properties within 3D biomaterials" Annual Biomedical Engineering Society Meeting, Biomaterials Track (2013), Seattle, WA.
39. Stoppel*, W.L., Crosby, A.J., Roberts, and S.C. "Measuring the mechanical contribution of cell-secreted extracellular matrix in 3D hydrogels." Gordon Research Conference and Seminar, Biomaterials and Tissue Engineering (2013), Holderness, NH (poster).
40. Wilson*, S.A., Roberts, S.C. "Mapping of secondary metabolic pathways for natural product synthesis in plant cell culture" Gordon Research Conference and Seminar, Plant Metabolic Engineering (2013), Waterville, NH.
41. Van Eck*, J., Keen, P., Wilson, S., and Roberts, S.C. "Factors that affect the recovery of *Taxus* transgenic cell lines" Society for In Vitro Biology Annual Meeting (2012), Bellevue, WA (poster).
42. Wilson*, S., Keen, P., Normanly, J., Walker, E.L., Van Eck, J., and Roberts, S.C. "Metabolic engineering of *Taxus* suspension cultures for enhanced production of paclitaxel" American Chemical Society National Meeting (2012), San Diego, CA (poster).
43. Stoppel*, W.L., Hutchens, S.B., Crosby, A.J., and Roberts, S.C. "Cavitation Microrheology: a new tool to understand mechanical microenvironments in 3D hydrogels." Gordon Research Conference, Signal Transduction by Engineered Extracellular Matrices (2012), Biddeford, ME (poster).
44. Stoppel*, W.L., White, J.C., Bhatia, S.R., and Roberts, S.C. "Perfluorocarbon addition and its effects on the transport of biomolecules in alginate hydrogels" Annual Biomedical Engineering Society Meeting, Tissue Engineering Track (2011), Hartford, CT (poster).
45. Horava*, S., Stoppel, W.L., White, J.C., and Roberts, S.C. "Terminal sterilization of composite alginate hydrogels" Annual Biomedical Engineering Society Meeting, Tissue Engineering Track (2011), Hartford, CT (poster).
46. Stoppel*, W.L., White, J.C., Bhatia, S.R., and Roberts S.C. "Perfluorocarbons: considerations for use in tissue engineered constructs" Gordon Research Conference, Biomaterials and Tissue Engineering (2011), Holderness, NH, (poster).

47. Paulose, B., Keshiri, S., Patil, R., Roberts, S., Walker, E., and Normanly*, J. "Identification and characterization of *Taxus* genes involved in paclitaxel accumulation" Gordon Research Conference, Plant Metabolic Engineering (2011), Waterville Valley, NH (poster).
48. Kolewe*, M.E., and Roberts, S.C. "Development of plant cell culture processes to produce natural product pharmaceuticals: Characterization, analysis and modeling of plant cell aggregation" Biochemical and Molecular Engineering XVII (2011), Seattle, WA (poster).
49. Kolewe*, M.E., and Roberts, S.C. "Green pharmaceuticals: Renewable production of natural product cancer drugs" NSF IGERT National Poster Competition (2011), online.
50. Gaurav*, V., and Roberts, S.C. "Plant cell culture process development: Use of flow cytometry for creation of specialized cell lines" ACS National Meeting (2010), Division of Biochemical Technology, Session on Upstream Processes, San Francisco, CA.
51. Kolewe*, M., Henson, M.A., and Roberts, S.C. "Population dynamics in plant cell culture" Pacific Biocomputing Symposium (2010), Kohala, HI (poster).
52. Stoppel*, W., Brown, M., Schneyer, A., and Roberts, S.C. "Improved alginate formulation for microencapsulation of islets" Engineering Biomaterials for Regenerative Medicine, paper RR3.53, Materials Research Society (2009), Boston, MA (poster).
53. White*, J., Luu, X., Wu, P., Lee, P., Roberts, S.C., and Bhatia, S.R. "Expediting the wound healing process using an improved alginate wound dressing" Engineering Biomaterials for Regenerative Medicine, paper RR3.52, Materials Research Society (2009), Boston, MA (poster).
54. Kolewe*, M., Henson, M.A., and Roberts, S.C. "A phenomenological model of aggregation dynamics in *in vitro* plant cell culture systems" Modeling Approaches to Examine Fundamental Issues in Life Sciences II, paper 375c, AIChE Annual Meeting (2009), Nashville, TN.
55. Patil*, R., and Roberts, S.C. "Gene expression analysis of *Taxus* cell culture subpopulations for targeted metabolic engineering of secondary metabolite accumulation" Advances in Metabolic Engineering II, paper 235d, AIChE Annual Meeting (2009), Nashville, TN.
56. Gaurav*, V., and Roberts, S.C. "Isolation and propagation of high secondary metabolite-accumulating plant cells cultures" Advances in Cell Culture II, paper 681b, AIChE Annual Meeting (2009), Nashville, TN.
57. Stoppel*, W., Brown, M., Schneyer, A., and Roberts, S.C. "Improving cellular function of microencapsulated cells using an improved alginate formulation" Biomaterials III, paper 646d, AIChE Annual Meeting (2009), Nashville, TN.
58. White*, J., Luu, X., Wu, P., Lee, P., Roberts, S.C., and Bhatia, S.R. "Expediting the wound healing process using an improved alginate wound dressing" Biomaterials II, paper 646b, AIChE Annual Meeting (2009), Nashville, TN.
59. Kolewe*, M., and Roberts, S.C. "Plant cell culture: Sustainable production of bioactive natural products" ACS National Meeting (2009), Washington, D.C.
60. Kolewe*, M., Henson, M.A., and Roberts, S.C. "Aggregation dynamics in plant cell culture as an approach to optimize natural product synthesis" Biochemical Engineering XVI (2009), Burlington, VT (poster).
61. Gaurav*, V., and Roberts, S.C. "Diterpenoid bio-synthesis in plant cells: Assay development, optimization and quantification" ACS National Meeting (2009), Division of Organic Chemistry, Session on Biologically-Related Molecules and Processes, Salt Lake City, UT.
62. Gaurav*, V., and Roberts S.C. "Development of a live cell-based immunofluorescent assay for the detection of pharmaceutically-relevant secondary metabolites in plant cells" ACS National Meeting (2009), Salt Lake City, UT (poster).
63. Kolewe*, M., Henson, M.A., and Roberts, S.C. "Aggregation dynamics in plant cell culture" Advances in Cell Culture II, paper 263b, AIChE Annual Meeting (2008), Philadelphia, PA
64. Gaurav*, V., Patil, R., and Roberts, S.C. "A FACS-based approach to characterizing culture heterogeneity based on accumulation of the anti-cancer agent pacliaxel in plant cell suspension cultures" Engineering Fundamentals in Life Sciences, paper 572bf, AIChE Annual Meeting (2008), Philadelphia, PA.
65. Roberts*, S.C., and Roberts, L.A. "A novel interdisciplinary biotechnology process engineering laboratory course at the University of Massachusetts Amherst" Truly Interdisciplinary Activities, paper 516b, AIChE Annual Meeting (2008), Philadelphia, PA.

66. Vongpaseuth*, K., Nims, E., Walker, E., and Roberts, S. "Novel systems for functional characterization of *Taxus* genes related to paclitaxel metabolism in plant cell culture" Banff Conference for Plant Metabolism (2008), Alberta, Canada (note: first place in poster competition).
67. Vongpaseuth*, K., Nims, E., Walker, E., and Roberts, S. "Development of a novel gene characterization system for paclitaxel-related genes" Plant Metabolic Engineering Gordon Conference (2007), Tilton, NH (poster).
68. Nims*, E., Dubois, C., Roberts, S., and Walker, E. "Regulation of Taxol metabolism in suspension cell culture" Plant Metabolic Engineering Gordon Conference (2007), Tilton, NH.
69. Nims*, E., Dubois, C., Roberts, S., and Walker, E. "Regulation of Taxol metabolism in suspension cell culture" New England American Society of Plant Biologists (2007), Syracuse, NY (poster).
70. Chin*, K., Bhatia, S., and Roberts, S. "Perfluorocarbons for enhanced oxygen transport in tissue engineering devices" paper 191e, AIChE Annual Meeting (2005), Cincinnati, OH.
71. Roberts*, S., Nims, E., Dubois, C., Boutaoui, N., Vongpaseuth, K., and Walker, E. "Molecular approaches for identification of metabolic engineering targets for enhanced paclitaxel accumulation" paper 196f, AIChE Annual Meeting (2005), Cincinnati, OH.
72. Nims, E., Boutaoui, N., Dubois, C., Roberts, S., and Walker*, E. "Expression profiling of genes involved in biosynthesis of paclitaxel" American Society of Plant Biologists Annual Meeting (2005), Seattle, WA.
73. Nims*, E., Boutaoui, N., Dubois, C., Roberts, S., and Walker, E. "Expression profiling of genes involved in biosynthesis of paclitaxel," Plant Metabolic Engineering Gordon Conference (2005), Tilton, NH (poster).
74. Naill*, M., Nims, E., Walker, E., and Roberts, S. "Metabolic control of taxane accumulation at the mRNA level" paper 479b, AIChE Annual Meeting (2004), Austin, TX.
75. Khattak*, S., Chin, K., Bhatia, S., and Roberts, S. "Improved oxygen supply in cell encapsulation systems" paper 463g, AIChE Annual Meeting (2004), Austin, TX.
76. McPartland, T, Malone*, M., and Roberts, S. "Liquid-liquid extraction for recovery of paclitaxel from plant cell culture: Solvent evaluation for partitioning and selectivity and the utilization of reactive agents" paper 464f, AIChE Annual Meeting (2004), Austin, TX.
77. Dubois*, C., Esclassan, J., and Roberts, S. "Paclitaxel stability and conversion through metabolite analysis in *Taxus* cell suspension cultures" paper 87, Third International Congress on Plant Metabolomics (2004), Ames, Iowa (poster).
78. Naill*, M., Nims, E., Walker, E., and Roberts, S. "Correlation of metabolite profiling and gene expression in paclitaxel-accumulating *Taxus* cell suspension cultures" paper 88, Third International Congress on Plant Metabolomics (2004), Ames, Iowa (poster).
79. Khattak*, S., Spatara, M, Bhatia, S., and Roberts, S. "Perfluorocarbon oxygen carriers in cell encapsulation" paper 384a, AIChE Annual Meeting (2003), San Francisco, California.
80. Naill*, M., and Roberts, S. "Flow cytometric analysis of *Taxus* cell suspension cultures" paper 469c, AIChE Annual Meeting (2003), San Francisco, California.
81. Naill*, M., and Roberts, S. "Investigating cell subpopulation dynamics of *Taxus* cell suspension cultures: A single cell method" paper 383, ACS Annual Meeting (2003), New Orleans, Louisiana.
82. Khattak*, S., and Roberts, S. "Designing an *in vitro* cell culture model to predict drug pharmacokinetics and stability" paper 12, ACS Annual Meeting (2003), New Orleans, Louisiana.
83. Matthew, J., Bhatia, S., and Roberts*, S. "PEO-PPO-PEO gels as materials for mammalian cell encapsulation" paper 298a, AIChE Annual Meeting (2002), Indianapolis, Indiana.
84. Roberts*, S. "Initiatives to establish bioengineering and bioinformatics at the University of Massachusetts" paper 165c, AIChE Annual Meeting (2002), Indianapolis, Indiana.
85. Roberts, S., Laurence, R., and Conner*, W. "Unit operations laboratory: A moveable feast" paper 166a, AIChE Annual Meeting (2002), Indianapolis, Indiana.
86. Naill*, M., and Roberts, S. "Characterization of plant cell culture variability via flow cytometry" paper 304a, AIChE Annual Meeting (2001), Reno, Nevada.
87. Bhatia*, S., and Roberts, S. "Development of communication skills in beginning engineering students" paper 222c, AIChE Annual Meeting (2001), Reno, Nevada.

88. Esclassan, J., Naill*, M., and Roberts, S. "Paclitaxel stability in plant cell suspension cultures" paper 300ak, AIChE Annual Meeting (2001), Reno, Nevada (poster).
89. McAuliffe*, G., Roberts, L., and Roberts, S. "Development of an *in vitro* system to study the effects of the anti-cancer drug Taxol on mammalian cell cultures" paper 300aj, AIChE Annual Meeting (2001), Reno, Nevada (poster).
90. Lovy Wheeler*, A., and Roberts, S. "The study of Taxol trafficking and release using TEM and fluorescence microscopy" Northeast Section of the American Society of Plant Biologists, Worcester Polytechnic Institute (May 4-5, 2001), Worcester, Massachusetts (poster).
91. Esclassan*, J., Michon, J., and Roberts, S. "Study of the taxane biosynthetic pathway and the degradation of paclitaxel in plant cell suspension cultures" Northeast Section of the American Society of Plant Biologists, Worcester Polytechnic Institute (May 4-5, 2001), Worcester, Massachusetts (poster).
92. Roberts*, S., McAuliffe, G., Fisher, R., and Roberts, L. "Paclitaxel metabolism by clinically relevant cell lines and its effects on cell metabolism *in vitro*" paper 713.8, Experimental Biology Annual Meeting (2001), Orlando, Florida (poster).
93. Roberts*, S. "A successful introduction to chemical engineering first-semester course focusing on connection, communication and preparation" paper 62e, AIChE Annual Meeting (2000), Los Angeles, California; proceedings available.
94. Naill, M., and Roberts*, S. "Variability in paclitaxel accumulation in *Taxus* cell suspension cultures" paper 295b, AIChE Annual Meeting (2000), Los Angeles, California.
95. Roberts*, S., Fisher, R., and Roberts, L. "Development of an *in vitro* cell culture system for the study of drug metabolism using encapsulation technologies: Paclitaxel as a model drug" BMES Annual Meeting (2000), Seattle, Washington; published abstract, *Annals Biomedical Engineering*, T7.19.
96. Fisher, R., Roberts, S., Peattie*, R., and Bronzino, J. "Characterization of a spinning cone contactor as a tissue engineering bioreactor" BMES Annual Meeting (2000), Seattle, Washington; published abstract, *Annals Biomedical Engineering*, T12.38.
97. Roberts*, S., and Fisher, R. "Efficacy, stability and hysteresis in encapsulated cellular systems" IEEE Northeast Regional Biomedical Engineering Conference (2000), Storrs, Connecticut; proceedings available.
98. Ghanem*, A., and Roberts, S. "Group self-assessment surveys as a tool to improve teamwork" Frontiers in Engineering Annual Conference (1999), San Juan, Puerto Rico; proceedings available.
99. Roberts*, S. "Development of experimental and mathematical techniques for the characterization of the biosynthetic pathways of valuable plant products" Consortium for Plant Biotechnology Research, Inc. (1999), Washington D.C. (poster).
100. Roberts*, S., and Shuler, M. "Characterization of Taxol release from plant cell tissue cultures" IEEE Northeast Regional Biomedical Engineering Conference (1999), Hartford, Connecticut.
101. Roberts*, S., Brincat, M., Gibson, D., and Shuler, M. "The study of secondary metabolite biosynthetic pathways in plant cell tissue cultures: Paclitaxel as a model compound" paper 267d, AIChE Annual Meeting (1998), Miami Beach, Florida.
102. Roberts*, S., and Shuler, M. "The effect of methyl jasmonate on the kinetics of paclitaxel production, taxane distribution, and degradation in plant cell cultures" AIChE Annual Meeting (1997), Los Angeles, California.
103. Roberts*, S., and Shuler, M. "Strategies for bioproduct optimization in plant cell tissue cultures" Biohydrogen Conference (June 1997), Kona, Hawaii.
104. Roberts*, S., Hollar, K., and Carlson, V. "Looking back: Lessons learned from 10 years of training teaching assistants" ASEE Annual Meeting (1997), Milwaukee, Wisconsin; proceedings available.
105. Roberts*, S., and Shuler, M. "Formulation of a metabolic model for the fate of Taxol after synthesis in plant cell cultures" paper 158g, AIChE Annual Meeting (1996), Chicago, Illinois.

TEACHING ACTIVITIES:

Courses developed and taught

- Introduction to Chemical Engineering (UG, freshmen, Engin 110): Redesigned course to provide a rigorous introduction to chemical engineering for first-semester students covering mass balances, process design and research approaches; Taught Fall 1998, 1999, 2000, 2002

- Fundamentals of Chemical Engineering (UG, freshmen, ChE 120): Taught Spring 2002, 2005
- Sophomore Honors Colloquium (UG, sophomore, ChE 230H): Developed and organized this new colloquium to provide our honors students with the opportunity to learn about departmental research and choose a research advisor to complete both independent study and thesis research; Taught Spring 2003, 2004, 2005
- Reaction Engineering (UG, junior, ChE 320): Taught honors component Spring 2000
- Unit Operations Laboratory (UG, senior, ChE 401): Taught Fall 2001, 2003, 2004, 2007; designed and implemented a new laboratory experiment in fermentation
- Senior Honors Colloquium (UG, senior, ChE 401H): Developed and organized this new colloquium to allow our senior level honors students access to departmental seminars to broaden their knowledge of cutting edge chemical engineering research; Taught Fall 2004, 2005
- Biotechnology Process Engineering Laboratory (UG, senior interdisciplinary, ChE 590A/Biochem 590A): Developed this new core laboratory course where students work in interdisciplinary teams (50:50 ChE and Biochemistry) to design a process to supply a high-value product. Molecular biology tools are used to engineer cells lines to express the protein of interest; cells are cultivated in bioreactors with designed process strategies; the protein product is recovered and purified using a variety of techniques; the final protein product is characterized in terms of protein quality and function; Taught Spring 2008, 2009, 2010, 2011, 2012, 2013, 2014
- Introduction to Biochemical Engineering (G/UG, ChE 592B): Developed the first elective course in bioengineering at UMass Amherst, focused on the application of chemical engineering and biochemistry principles to the design and optimization of processes in the food, pharmaceutical and medical industries; Taught Spring 1999, 2001, 2004, 2006 and Fall 2007, 2008, 2009, 2011, 2012, 2013, 2014
- Ethical Conduct of Research (G, ChE 797A/Chem 797J): Developed a module on data fabrication, plagiarism and credit; Taught Spring 2004, 2005, 2006
- Fundamentals of Cellular Engineering (G, interdisciplinary, ChE 690F): Developed and coordinated the core course for the IGERT Program in Cellular Engineering that involves ~15 faculty and provides an overview of cellular engineering fundamental and applied research areas, including applied systems biology, plant biotechnology, cytoskeleton, protein folding and engineering, stem cells and cancer, and membranes and delivery.; Taught Fall 2008, 2009, 2011, 2012, 2013
- ICE IGERT Graduate Seminar (G, interdisciplinary, ChE 797D): Coordinated for the IGERT Program in Cellular Engineering; this seminar series is a compilation of campus seminars relevant to cellular engineering offered across multiple departments and interdisciplinary graduate programs; Coordinated Spring 2008-2013, Fall 2008-2013
- ICE IGERT Journal Club (G, interdisciplinary, ChE 797S): Developed and coordinated for the IGERT Program in Cellular Engineering; this is a student run journal club entitled Classic and Current Papers at the Interface of Engineering and the Life Sciences that exposes students to a diverse array of interdisciplinary research topics in a relaxed environment that promotes peer networking, communication across disciplines and deeper insights into research and techniques not typically encountered in home department studies; Coordinated Spring 2010, 2011, 2012, 2013
- Topics in Plant Biology Research (G, interdisciplinary, Biochem 690A): Developed lectures on plant secondary metabolism and metabolic engineering; Taught Fall 2007, 2008, 2009, 2011, 2012
- Agricultural and Biotechnology Laboratory (UG, senior interdisciplinary, Biotech 385): Developed a laboratory module on plant cell culture including callus culture initiation, suspension culture cultivation, growth analysis and protein analysis through gel electrophoresis and Western blotting; Taught Spring 2000, 2001, 2002
- (WPI) Introduction to Biological Engineering (U, interdisciplinary, ChE 3301): Developed a 7-week term course to introduce students to bioprocess engineering including a molecular cloning module and NIH-inspired research proposal; Taught Spring 2016-present
- (WPI) Graduate Student Colloquium (G, ChE 502): A required graduate (PhD/MS) student colloquium in chemical engineering; focuses on professional development and diversity topics; Taught Fall 2020 and contributed lectures most years between 2015-2025

RESEARCH ADVISING ACTIVITIES:

***Postdoctoral Researchers* (2)**

- Nadia Boutaoui (2004-2006) "*Taxus* plant cell culture genomics" (co-advisor E. Walker), current position: iDOC, founder
- Ling Tao (2004-2005) "Optimizing fuel metabolism and delivery for diabetes treatment" (co-advisor S. Bhatia), current position: Senior Engineer, National Renewable Energy Laboratory

***Ph.D. Students* (15)**

- Michael Nail (ChE), 2005, "The use of flow cytometry to study variability of paclitaxel accumulation in *Taxus* cell suspension cultures," current position: VP, CMC Technical Operations, Dragonfly Therapeutics, Inc.
- Sarwat Khattak (ChE), 2006, "*In vitro* applications in drug metabolism and cell encapsulation," current position: Head of Cell Culture and Cell Line Development, Biogen
- Kyuongsik Chin (ChE), 2009, "Optimizing cell encapsulation devices through enhanced oxygen supply," current position: Advanced Cleans Technology R&D Leader, Dupont
- Kham Vongpaseuth (Plant Biology), 2011, "*Taxus* transformation and functional characterization of putative regulatory genes," current position: United States Department of Agriculture – Animal and Plant Health Inspection Service – Biotechnology Regulatory Services (USDA-APHIS-BRS)
- Vishal Gaurav (ChE), 2011, "Flow cytometry of cultured plant cells for characterization of culture heterogeneity and cell sorting applications," current position: Sr. Program Manager, Supply Chain, Lam Research
- Martin Kolewe (ChE), 2011, "Plant cell heterogeneity, aggregation and population dynamics," current position: CEO, Foodberry
- Rohan Patil (ChE), 2012, "Molecular analysis of *Taxus* cultures with varying levels of paclitaxel accumulation," current position: Senior Director, Alexion, AstraZeneca Rare Disease
- Stoppel Whitney (ChE), 2013, "Influence of chemical and mechanical properties on cell function in hydrogel encapsulation matrices," current position: Assistant Professor, University of Florida
- Sarah Wilson (ChE), 2015, "Multi-scale characterization and engineering of *Taxus* suspension cultures" current position: Assistant Professor, University of Kentucky
- Elizabeth Cummings (ChE), 2018, "New approaches in engineering somatic embryogenesis in loblolly pine suspension cultures" current position: Principal Scientist, Amgen
- Michelle McKee (Biology and Biotechnology), 2019, "Should I stay or should I go? The fight or flight defense responses in *Taxus* cell culture" current position: Director of Plant Cell Development, Ayana Bio; previously Postdoctoral Associate, Whitehead Institute
- Brzycki, Cassandra (Chemical Engineering), 2023, "Development of genetic tools for engineering secondary metabolism in *Taxus* plant cell culture" current position: Scientist, Ayana Bio
- Tahsin, Rahi (Chemical Engineering), PhD expected 2026
- Sasanno, Toni (Chemical Engineering), PhD expected 2026
- Ruiyi Wang (Chemical Engineering), PhD expected 2029

***M.S. Students* (6)**

- Julian Esclassan (ChE), 2001, "Paclitaxel stability in plant cell suspension cultures"
- Jeanne Michon (ChE), 2001, "Understanding taxane metabolism through the development of a cell-free system and studies on taxane degradation"
- Camille Dubois (ChE), 2005, "Profiling taxanes in plant cell suspension cultures"
- Lisa Leone (ChE), 2014, "Plant genome scale modeling"
- Antonia Dinicu (ChE), 2022, "Aggregation dynamics and relationship to secondary metabolite production in plant cell suspension cultures"
- Caroline Rauber (ChE), 2023, "Effect of continuous shear stress and enzymatic disaggregation on cell health and secondary metabolite production in *Taxus* plant cell culture"

***Research Technicians* (3)**

***Undergraduate Research Projects (* = UMA honors thesis; ^ = REU student; **= WPI MQP)* (~100)**

Amit Shavit* Whitney Stoppel^ Jordan Atlas* Katie Crowley

Nik Finneran*	Jonathan Moreno*	Lauren Hurd	Matthew Podkowka
Joshua Stacey	Daniel Hines*	Gretchen McAuliffe*	Tom Sturgis
Brody Stara	Zoltan Mester	Tarit Mukhopadjyay	Kerry Camp
Reneta Ivanova	Kevin Ripston	Bryan Looze	Sally Wang^
Rachel Harrison	Cheng-Yuk Lee	Colin Tuohey	Gaby Mas^
Anudha Mittal	David Babson*	Terrence Ryan	Seth Kitchener
Kori Dunn^	Michael Lovett*	Scott Turnberg	Robert Harmon^
Eva Shah*	Julie Matthew*	Jennifer Talbot	Steve Cole
Melissa StAmand*	Michelle Spatara*	Jayme Brown	Meenal Datta*
Sarena Horava*	Katie Geldart*	Meghan Coombs^	Vanessa Mukania^
Nicole Raia*	Nicholas Cadirov*	Kristen Garcia^	Nathan Bade^
Mantoni, Kelsey*	Frantz, William*	Alec Gramman*	Emily Hartzell^
Julia Petrullo^	Vilkovoy, Michael*	Angela Chen^	Bronwyn Finney*
Abdoul Bamba	Matthew Long*	John Vetrano*	Steven Ayotte*
Michaela Jacobs^	Ryanne Dailey**	Clydeblaise Niba**	Matthew Portugal**
Benjamin Small**	Shawn Wiley**	Lexi Crowell**	Margaret LaRoche**
Michelle Addai**	Yaw Opare-Sem**	Miya Bidon**	Michael Bodanza**
Nathan Hague**	Seth McClenahan**	Wesley Rogers**	Dasia Aldarondo**^
Donald Dione**	Adele Werner**	Michaela Johnson**	Jason Rivers**
Summer Thurlow**	Michaela Gamache**	Emily Whittles**	Gabriella Mazzoni**
Sean Horton**	Lauren Revene**	Alexandra Harrison**	Jay Gandhi**
Val Corrente	Paige Grissom^	Gabriel Garbes**	Jonathan Martin**
Jada Smith**	Deah Zajmi**	Aili Bray**	Taylor Fiore**

***Thesis Committee Member* (>50)**

- Chemical Engineering: 34 Ph.D. and 5 M.S.
- Polymer Science and Engineering: 2 Ph.D.
- Molecular and Cellular Biology: 1 Ph.D. and 1 M.S.
- Plant Biology: 2 Ph.D., 1 M.S.
- Chemistry: 8 Ph.D.
- Mechanical & Industrial Engineering: 1 M.S.

PROFESSIONAL ACTIVITIES AND SERVICE:

National and International

- 60th Anniversary Volume of Chemical Engineering Education Steering Committee (2025), invited member
- NIIMBL (National Institute for Innovation in Manufacturing Biopharmaceuticals) Executive Committee, member (2018-2023)
- Proposal Referee:
  - National Science Foundation panels: SBIR, BES CAREER, BES POWRE, BES Large-Request Proposals, CBET proposal review, DGE IGERT full proposal review
  - National Institutes of Health: ad-hoc panel for the Roadmap Initiative in Natural Products Chemistry, ad-hoc member of Synthetic and Biological Chemistry B (SBCB) review panel, ad-hoc member of Small Business: Biological Chemistry, Biophysics, and Drug Discovery review panel, R13/U13 ad-hoc review panel, ad-hoc P01 revie, F32 ad-hoc panel, F30/F31/F32 Fellowships ad-hoc panel
  - Department of Energy site review team for BioEnergy Science Center (BESC) (2011)
- American Institute of Chemical Engineers (AIChE)
  2001-2015 Session co-chair for annual Meeting (Multiple sessions in Areas 4 and 15)
- Journal referee: *Science, Nature Biotechnology, PNAS, Biotechnology Progress*, *Enzyme and Microbial Technology*, *Metabolic Engineering*, *Journal of Bioscience and Bioengineering*, *Food Biotechnology*, *Plant Cell Reports*, *Biotechnology and Bioengineering, Nature Chemical Biology, Biomaterials, Tissue Engineering, Biotechnology Letters, Biochemical Engineering Journal, Biophysical Journal*

- Book Referee: McGraw-Hill, Oxford and Elsevier
- Professional Societies: American Institute of Chemical Engineers (AIChE), BEACON, American Chemical Society (ACS), Biomedical Engineering Society (BMES), American Society for Engineering Education (ASEE), American Association of University Women (AAUW)

University and College Service

WPI

- CEAE Department Head Search Committee, chair (2023-2024)
- WPI Presidential Search Committee, member (2022-2023)
- Lead with a Purpose Strategic Planning Committee (2022-2023)
- Faculty Forum, co-chair (2022-2023)
- Center for Advanced Biomanufacturing Executive Committee, member (2022-present)
- Engineering Advisory Board, Faculty Activity Models Committee, member (2021-present)
- Teaching Path to Tenure Implementation Committee, member (2021-2023)
- VP for Talent and Inclusion Search Committee, member (2021)
- Future of WPI Education Committee, member (2020-2021)
- WPI Strategic Plan Steering Committee, member (2020-2021)
- Presidential Appointee to the Board of Trustees, Facilities and Campus Infrastructure Committee (2017-2023)
- Presidential Fellowship Selection Committee, member (2019-2022)
- Academic Space Committee, member (2016-2019)
- BioPoint Cellular and Molecular Engineering Cluster, leader (2018-2023)
- Dean of Engineering Search Committee, member (2016)
- Committee on Governance (COG), member (2017-2020); Presidential appointee (2021-2022)
- BETC Advanced Biomanufacturing Annual Symposium Planning Committee, member (2016-2017)
- Graduate School Search Committee for Director, Office of Professional Development, member (2016)
- COAP-COG Working Group on Promotion, member (2017-2020)
- TA Allocation Committee, member (2017)
- Research Solutions Institute Search Committee for Director, member (2017)
- Graduate School Assistant Dean Search Committee, member (2016)
- Life Sciences Building Operating Committee, executive member (2015-present)

UMass Amherst

- Individual Development Plan (IDP) Template Committee, Chair (2014-2015)
- Industry-University Research Awards Committee, Chair (2014)
- Graduate School Policy Committee (2014-2015)
- Graduate School Diversity Grants Committee, Chair (2013-2015)
- Graduate School Dissertation Research Grants Committee, Chair (2013-2015)
- Graduate Council (2013-2015)
- MLSC Life Sciences Executive Committee (2012-2015)
- Pharmaceutical Sciences Committee (2012-2013)
- Tenure Standards Committee (2012-2013)
- Life Sciences Laboratories Planning Committee, Design Chair for 5th Floor (2009-2015)
- NSF IGERT on Cellular Engineering, Director (2007-2014)
- NSF REU on Cellular Engineering, co-Director (2007-2012), Director (2012-2015)
- Genomics Research Community Forum Planning (2007-2012)
- Distinguished Faculty Lecture Selection Committee (2006-2008)
- Institute for Cellular Engineering, Director (2005-present)
- UMass Amherst Flow Cytometry Facility, co-Director (2005-2010)
- Department of Chemistry Faculty Search Committee (2004, 2010)
- College of Engineering Community, Diversity, and Social Justice (CDSJ) Committee, co-Chair (2004-2006)
- College of Engineering ELAB II Building Dedication Committee (2004-2005)

- Integrated Sciences Building Committee (2003-2005)
- NIH Chemistry-Biology Interface Executive Committee (2002-present)
- NIH Chemistry-Biology Interface Curriculum Committee (2002-2006)
- Plant Biology Graduate Program Steering Committee (2002-2010)
- College of Engineering Freshmen Program Committee (2002-2005)
- Life Sciences Steering Committee (2001-2005)
- College of Engineering Diversity Committee (2000-2002)
- College of Engineering Freshmen Engineering Program: co-coordinated Freshmen Majors Night for Chemical Engineering Department (Spring and Fall, 2000 & 2002)
- University TA Development Program, workshop instructor (1999-2005)
- Women in Engineering Program Representative (1998-present)
- College of Engineering Freshmen Orientation Advisor (1998-present)

Chemical Engineering Departmental Service (UMass); currently serve as Department Head at WPI

- Distinguished Faculty Speaker Committee (2014)
- By-laws Committee (2012-2015)
- Faculty Search Committee (2000-2002, 2003-2004, 2005-2007, 2008-2009, 2009-2010)
- Personnel Committee (2005-2006, 2007-2008, 2009-2010)
- Alumni Outreach Committee (2007-2008)
- Department Head Search Committee (2004-2005)
- Departmental Honors Coordinator (Fall 2002; Fall 2003-Fall 2005)
- Undergraduate Program Committee (2002-2005, 2007-2008, 2013-2014)
- Graduate Program Committee (2004-2005, 2011-2012, 2013-reviewed applications)
- Website Design Committee (2002)
- Senior Laboratory Committee, chair (2002)
- AIChE Student Chapter, faculty advisor (1998-2001)
- Graduate Seminar Series, coordinator (1999-2002)
- Ph.D. Qualifying Exam Committee, member (2005-2015)
- Ph.D. Qualifying Exam Committee in Kinetics, member or chair (1999, 2001, 2002, 2003, 2004)
- Women in Chemical Engineering Group, faculty advisor (2000-2003)
- Class Advisor (2001-2003)

Public Service

Professional

- GALY Cotton Week, academic expert (2024)
- Northeastern University Chemical Engineering Department Advisory Board, member (2016-2019)
- Agenus Bio, Scientific Advisory Board, member (2016-2017)
- Exelixis Plant Sciences, Inc., consultant (2004-2006)

K-12

- Academy for Science and Design (ASD), Nashua NH (2024), senior project judge
- Camp Reach, Worcester MA, (Summers 2016-2018), a weeklong hands-on program for local 7th grade girls interested in science and engineering
- Touch Tomorrow, Worcester, MA, (June 2016-2019), a campus-wide free and open to the public event on the Worcester Polytechnic Institute campus that consistently hosts 2000+ attendees with activities in science, technology, and robotics
- Introduce a Girl to Engineering Day, Worcester, MA, (Feb 2016-2018), a program for local urban grades 3-5 girls involving presentations and hands-on activities in various fields of engineering
- Women in Engineering Career Day Event (high school), Amherst, MA, faculty panel (1998, 1999, 2000), invited speaker (2001, 2002), workshop coordinator (2014)
- Minority in Engineering Career Day Event (high school), Amherst, MA, poster display and laboratory tour

(2000, 2001), invited speaker (2002)
- High School Outreach, visits to local public schools (e.g., Chicopee Comp. High School)
- Discovery Methods in Chemistry and Chemical Engineering, workshop designed for K-12 educators illustrating simple experiments to demonstrate important concepts in Chemistry and Chemical Engineering (2001), Amherst, MA, co-instructor with J. Fermann (UMass Amherst Department of Chemistry)
- Smith Summer Science and Engineering Program (high school girls), instructor, Northampton, MA (2001)

Public/Community
- Presented at the Women's Impact Network Conference on "The new horizon for Biotech: Using natural substances for health" (April 2017)
- Presented at Sci Tech Café in Northampton, MA to the general public on the "Power of Plants," highlighting my research on medicinal plants and informing the general public on challenges in bioengineering (March 2016)
- Interview for "Every Woman" series on local NBC affiliate (WWLP, TV 22); goal was to increase public awareness of the extraordinary role of women in the community and to encourage young girls to pursue their dreams (1999)

CURRENT, PENDING AND COMPLETED FUNDING:
- Mass Life Sciences Center (MLSC) Bits-to-Bytes Program (PI Roberts, co-PI Kurnat). "Development of a Robust Strategy for Production of Vaccine Adjuvants in *Quilaja saponaria* plant cell suspension culture," $1,278,876, 9/1/2024-8/31/2027.
- WPI Catalyst Award (co-PIs Roberts, Young and Teixeira). "AI4BIO," $50,000, 2024-2025.
- SaponiQx industrial support for developing a commercial plant cell culture process to synthesize vaccine adjuvants (PI Roberts). $450,000, 6/1/2022-8/31/2024.
- NIH Diversity Prize (PI Roberts, co-PIs Billiar, Demetry, Farny and Long). "Promoting Women of Diverse Creative Expertise," $50,000, Fall 2021.
- WPI Women's Impact Network and matching funds (PI Demetry, co-PIs Roberts and Gerike). "Supporting Equity in Faculty Career Advancement During and After the COVID-19 Pandemic," $143,000, 6/1/2021-5/31/2022.
- NSF ADVANCE Program (PI Skorinko, co-PIs Roberts, Demetry, Farny and Long). "Advancing Toward Equity for STEM Faculty" (https://www.wpi.edu/offices/provost/advance) $998,853, 9/1/2018-8/31/2023.
- NIIMBL Workforce Development Grant on Bio-automation with state matching (NCSU, WPI, UMD, IAAE and industry partners; Roberts PI from WPI) $1,000,000 ($240,000 to WPI), 9/1/2018-8/31/2019.
- WPI Women's Impact Network (PI Demetry, co-PI Roberts). "Advancing Women Associate Professors with Mentoring Mini-Grants," $25,000, 6/1/2017-5/31/2018.
- NSF CBET Program (PI Hardy, co-PI Roberts) "A Novel Cell Selection System Using Evolved Natural-Product Caspases," $600,000, 9/15/2015-8/31/2021.
- NIH T32 grant (multiple PIs Osborne and Roberts). "Cellular Engineering Biotechnology Training Program." $1,598,015, 07/01/15-06/30/20.
- NSF REU Program (PI Roberts, co-PI Garman). "REU Site: Engineering Across Cell Types." EEC 1263235, $358,389, 3/1/13-2/28/16.
- UMass President's Office Science & Technology Fund (PIs Roberts and Vierling). "Massachusetts Bio-Foundry: Center for Discovery & Synthesis of Bioactive and Industrial Molecules." $150,000, 07/1/14-06/30/16.
- Weyerhaeuser industrial support for the application of our knowledge and tools in plant aggregation to the study of somatic embryogenesis (PI Roberts), $100,000, 10/1/11-12/31/18.
- NSF MRI Program (PI Minter, co-PIs Bezanilla, Rotello, Roberts). "Acquisition of FACSARIA-II, a next-generation high-speed cell sorter for a Flow Cytometry Core supporting interdisciplinary research and train-

ing." DBI 1126366, $384,586, 8/1/11-8/1/14.

- NIH General Medical Sciences (PI Roberts, other PIs Normanly and Walker). "Molecular Approaches to Understanding Global Regulation in Paclitaxel Accumulation." 5RO1 GM070852-05, $818,266, 09/15/2009-09/14/2013.
- NSF IGERT Program (PI Roberts, co-PIs Bhatia, Hardy, Normanly, Petersen). "Interdisciplinary Graduate Research Training in Cellular Engineering." DGE 0654128, $3,000,000, 09/01/2007-08/31/2014.
- NSF CBET Program (PI Roberts, co-PI Henson). "Controlling Heterogeneity in Plant Cell Culture and Secondary Product Accumulation through Metabolic Analysis and Modeling of Population Behavior." CBET 0836474, $419,665, 09/01/2007-08/31/2013.
- NSF REU Program (PI Bhatia, co-PI Roberts). "REU Site: Exploring Engineered Cells." EEC 1005083, $328,766, 05/01/2010-04/30/2013.
- Massachusetts Technology Collaborative Program, CEAR Postdoctoral Fellowship Award (PIs Roberts and Schneyer). "Enhanced Oxygenation of Pancreatic Islets to Improve Transplantation Success." $160,000, 06/01/2008-05/31/2010.
- NSF REU Program (PI Bhatia, co-PI Roberts). "Summer REU Site on Cellular Engineering." EEC 0649041, $319,714, 06/01/2007-05/31/2010.
- NSF DUE Program (PI Ergas, co-PIs Andersen, Rinderle, Roberts, Rubin). "Expanding the Engineering Pipeline by Recruiting, Mentoring and Graduating Transfer Students." DUE 0728485, $598,181, 09/01/2007-08/31/2012.
- Dreyfus Foundation Special Grant Program in the Chemical Sciences (PI L. Roberts, co-PI S. Roberts). "High-Throughput Instrumentation for a Novel Multidisciplinary Laboratory Course for Biochemistry and Chemical Engineering Students." $40,000, 06/01/2006-05/31/2009.
- NSF MRI Program (PI Roberts, co-PIs Lovley, Osborne). "Acquisition of a Multiparameter High-Speed Cell Sorter." CBET 0521223, $427,950, 08/01/2005-07/31/2008.
- NIH General Medical Sciences (PI Roberts, co-PI Walker). "Molecular Approaches to Understanding Global Regulation in Paclitaxel Accumulation." RO1 GM70852, $737,787, 01/01/2004-12/31/2008.
- Glass Foundation (PI Braun, co-PIs Bhatia, Chipkin, Roberts). "Optimizing Energy Metabolism for Diabetes Treatment." $482,402, 05/02/2004-04/30/2007.
- UMass Faculty Research Grant (PI Roberts, co-PI Normanly). "Use of Proteomics Technologies to Understand Control of Paclitaxel Metabolism." $10,000, 02/01/2003-01/31/2004.
- NSF, Materials Research Science and Engineering Center (MRSEC) Program (PI Russell). "MRESC on Polymers: IRG III, Aqueous Polymer Assembly." ~137,500 for Roberts laboratory, total of 11 faculty in IRG III, 05/01/2002-04/30/2007.
- UMass Faculty Research Grant (PI Roberts). "Development of an in vitro System to Study Paclitaxel Metabolism and its Effects on Mammalian Cell Metabolism." $15,000, 06/01/2002-05/31/2003.
- Collaborative Biomedical Research Program (PI Roberts, co-PI Bhatia). "Development of a Novel Cell Encapsulation System." $30,000, 09/01/2001-08/31/2003.
- NSF Career Program (PI Roberts). "Optimizing Synthesis of Valuable Products from Plant Cell Cultures Through an Understanding of Metabolic Control and Variability – Bioengineering Research and Education." CBET 0400664, $214,500, 09/01/2000-08/31/2004.
- UMass Faculty Research Grant (PI Roberts). "Characterization of the Variability in the Accumulation of Valuable Products Produced via Plant Cell Culture." $15,000, 01/01/2000-12/31/2001.
- Undergraduate Research Support. Support from various sources including UMass, NSF SPUR Program, NSF

REU Programs (non-cellular engineering), NSF REU supplements, Hamilton Sundstrand. ~$100,000.

PROFESSIONAL DEVELOPMENT:

Workshops Attended

- Worcester Leadership Conference, Worcester, MA (June 2022)
- ACE Leadership Academy for Department Chairs, Miami, FL (January 2016)
- HERS Women Leaders in Higher Education Institute (Wellsley College, 2014-2015)
- COACh (Committee on the Advancement of Women Chemists) Workshop on "Coaching Strong Women in the Art of Strategic Persuasion," AIChE Annual Meeting, Reno (2001)
- NSF Engineering Education Scholars Workshop, Carnegie Mellon University, Pittsburgh (1997)

Workshops/Presentations Developed and Offered

- Change Management and Leadership (WPI Women's Leadership Program; co-developed with J. Sabourin), WPI, Fall 2023 and 2024 (four-hour workshop, ~25 participants)
- "From Manager to Catalyst for Innovation: Transforming the Role of Department Heads for Mid-Career Faculty," offered at the ADVANCE Resource and Co-Coordination (ARC) Network Equity in STEM Community Convening with E.L. Long, October 6-8, 2019, Cleveland, OH
- "Advancing into Academic Leadership," offered at the AIChE Annual Meeting with W. Stoppel and J. Washington, 2019
- "Associate Professor Mentoring Workshop and Mentoring Teams, part of ADVANCE grant; developed a Career Development Plan Template and Mentoring Teams framework (included in the faculty handbook); offer numerous workshops during the year to assist associate professors in planning their career and promotion to full professor, WPI, 2017-present
- "Career (and Life) Development," presented to female graduate students as part of the Graduate School's Professional Development initiatives, WPI, 2017-2020
- "Effective Mentoring," WPI STARS faculty-student panel, 10/21/2016
- "Finding Balance in the Wheel of Life," presented at the Women of WPI Event, 11/12/2016
- "Research Opportunities and Preparation," AIChE student group, 11/28/2016
- "NSF Graduate Research Fellowships," presented to WPI REU students, 6/6/2016
- "Opportunities in Mentoring and Graduate Education," WPI Life Sciences Advisory Board, 4/11/2016
- Modeling Cellular Metabolism and Processes (laboratory module for IGERT Program; co-developed with M. Henson), UMass Amherst, summer 2008, 2010 (10 participants)
- MICELS: Mentoring Individuals for Careers in Engineering and the Life Sciences, bioengineering group meeting with outside speakers, UMass Amherst, 2002- 2006
- Teaching Problem Solving in Engineering and Sciences (part of the campus-wide TA training effort), UMass Amherst, fall 1999-2005 (~35 participants each year)
- Discovery Methods in Chemistry and Chemical Engineering, workshop designed for K-12 educators illustrating simple experiments to demonstrate important concepts in Chemistry and Chemical Engineering, fall 2001, co-instructor with J. Fermann (UMass Amherst Department of Chemistry) (~30 participants)
- Teaching in the Laboratory: Chemistry Department TA Orientation, UMass Amherst, Start of fall semester 1999-2002 (~30 participants each year)
- Biochemical Engineering and the Supply of Anticancer Medications, Smith College Summer Science Program, 7/2/2001 – 7/13/2001, 80 contact hours (16 participants)
- Preparing for Graduate School, UMass Amherst, Fall 1998 (15 participants)
- Laboratory: Kinetics of Wine Making, UMass Amherst, Fall 1998 (6 participants)