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EMPLOYMENT

Assistant Professor and Undergraduate Program Director

Aug 2019 – present

Department of Biomedical Engineering (BME), University of Virginia, Charlottesville VA

- Ensure that BME remains an innovate and highly effective learning environment for BME undergraduate students
 - Lead and direct the development and implementation of the BME undergraduate educational learning outcomes
 - Chair the BME Undergraduate Program Committee
 - Serve as a source of guidance on Departmental undergraduate student best practices for Department Chair and faculty, and facilitate faculty engagement with undergraduate students.
 - Lead and coordinate accreditation activities for ABET and other appropriate bodies
 - Regularly gather and analyze appropriate data toward continuous program improvement.

- Ensure that the BME environment is one where undergraduate students feel a sense of belonging, are supported, and where their voices are heard and respected.
 - Work with BME Diversity, Inclusion, and Engagement Committee, as well as BME undergraduate student leaders and student groups, to ensure academic policies and learning outcomes reflect diversity and inclusion best practices, and that there are accessible support structures in place for all students.

- Instruct BME undergraduate courses, based on interests and current needs

Director of Graduate Education,

Sept 2016 - present

UVA Engineering, University of Virginia, Charlottesville, VA

- Lead and direct strategic vision of the graduate programs in UVA Engineering:
 - Work with School Deans, other School leadership, and peers across Grounds to provide leadership, and direct and develop strategies and policies, that impact graduate students and post-docs
 - Serve as a source of guidance on graduate student and post-doc-related best practices for Department Chairs and Graduate Program Directors.
 - Coordinate the Graduate Working Group, a group of SEAS faculty that support a variety of efforts including fellowship selection and policy proposals

- Growing the size, quality, and diversity of the graduate program: Created, implemented, and oversee a comprehensive School-wide graduate student recruitment program toward increasing the quality, quantity, and diversity of SEAS graduate student body that focuses on reputation-building, enrollment, and yield.
 - A vibrant diversity-focused conference recruitment schedule
 - New marketing materials created in collaboration with the Office of Communications
 - The strategic development of a national and global digital marketing campaign focused on enrollment and yield, created in partnership with the Office of Communications
 - A high-touch automatic prospective applicant follow-up process that includes emails and phone calls from the School, Program of interest, individual faculty, and alumni & Trustees
 - A campus visitation program whereby undergraduates from minority-serving institutions are invited to Grounds to learn about graduate school and UVA Engineering in particular.
 - An expanded and enhanced on-Grounds recruitment weekend that includes academic, research, and social events, with participation from current students, faculty, alumni, and Trustees.
 - Formation and Chair, UVA Engineering Graduate Recruitment Committee
 - Outcomes :
 - In two years, increased the number of PhD student applicants by 51%, the admission rate of those applicants by 50%, and matriculation of them by 41%, achieving the highest number of each in ten years.
 - Out of the top 40 Engineering PhD programs, UVA Engineering has had the highest 2-year growth rate. In collaboration with my staff and the Office of Communications, a comprehensive strategic graduate student recruitment plan was developed and implemented, and included:
 - In two years, the number of African American and Hispanic PhD applicants increased 290% and 231%, respectively; with a 500% and a 114% increase in those matriculating. These are the highest numbers in the history of the School.
 - In two years, the percentage of matriculating PhD students who are female increased from 29% to 36%.

- Providing a solid financial foundation of support for incoming PhD students: Fundraising and stewardship of all endowed and one-time gifts toward support of graduate students.
 - In two years, a total of \$11.4 millions of fellowship funds were raised toward PhD student support. In collaboration with the Office of Advancement, we developed highly compelling fundraising campaigns and funding proposals, all focused on total fellowship support for incoming students. These fellowships were powerful tools for student recruitment.

- Growing the diversity of the graduate student body: In one year, increased the number of underrepresented minority applicants to our graduate program by 60%, achieving the highest number of URM graduate applicants in the history of the School. In collaboration with my staff and the Office of Diversity & Engagement, a multi-level URM recruitment approach was designed and executed, and included:
 - An enhanced digital marketing campaign targeted to minority-serving institutions
 - A high-touch URM prospective student follow-up program initiated at first contact and carried out all the way through matriculation.

- The leveraging of strong partnerships with GEM, Leadership Alliance, and McNair Scholars, including hosting events for each on-Grounds and the delivery of content and sponsorship at the national conferences of each.
 - Building important relationships with minority-serving institutions, making campus visits and hosting visits on-Grounds.
- Enhancement of the admissions process to better align with core values:
- Conducted a School-wide faculty education program on the proven metrics of graduate school success
 - Overhauled the application system to better reflect these proven metrics
 - Designed and implemented an admissions rubric as a tool for reviewing applications.
 - These efforts have resulted in an increase in the admission of underrepresented groups into the School, and an overall move away from using the GRE as a screening tool in admissions.
- Development of a comprehensive program that fosters future engineering leaders: Designed and implemented a professional development program for graduate students, centered around the concept of Knowledge Entrepreneurs or agents-of-change who actively shape their research and careers. The program focuses on five habits of successful engineering leaders: 1) excellent problem solving skills, 2) skilled communications to a wide variety of audiences, 3) a cutting edge pedagogical toolbox, 4) teamwork and collaboration, and 5) ethics and compassion. Professional development offerings are made available in a wide variety of formats for optimum engagement, and in partnership with Schools and resources across the University:
- Courses: Both 1- and 3-hr courses were designed, including
 - Knowledge Entrepreneurship- a foundational course offered to incoming graduate students preparing them for to take ownership of their graduate studies
 - Communicating Research to Non-Technical Audiences
 - Technology Innovation
 - Ethics & Compassion in Engineering Research
 - Government Contracting
 - Leadership in Engineering
 - ESL for Engineers
 - Workshops: Instructional and hands-on workshops are offered through the year on topics such as project management, job searches and the application process, mindfulness, time management, communications, data visualization, design thinking, etc.
 - Experiential Learning Opportunities: Hands-on learning experiences were designed and implemented including:
 - Graduate Teaching Internship Program: Participants co-teach a course with faculty, learning and applying fundamental pedagogical skills in a teaching practicum. Participants are listed as co-instructors for the course, receive advisement and feedback from the instructor, receive student evaluations, and meet with other interns (past and present) for support and exchange of ideas.
 - The UVA Engineering Graduate Research Symposium (UVERS): To hone newly developed communication skills, students compete in poster and oral presentations. UVERS also includes a networking opportunity with UVA Engineering alumni, Trustees, and corporate sponsors.

- The Graduate Writing Lab: Hired the Director of this Lab, as well as, Lab tutors, to provide one-on-one consultations, facilitated peer-review groups, workshops, and panels, all focused on improving the basic and technical writing/presentation needs of our graduate students.
- Responsible for planning, development, implementation, and evaluation of all graduate programs in the School of Engineering
- Develop and increase support structures for a diverse graduate student body
 - Formation and Chair of the UVA Engineering Graduate Student Success Working Group, which includes faculty, staff, and students all working together to design student support systems within UVA.
 - Design and implementation of the Dean's Scholar Fellowship program, which includes academic, research, career, and personal development training opportunities for all graduate students.
 - Revamped new student orientation to incorporate cohort-building and to more fully elucidate student support mechanisms and structures across Grounds
 - Design and pilot of the Excellence is Diversity Bridge-to-PhD program for underrepresented and first generation engineering students
- Other duties and responsibilities:
 - Administer SEAS academic requirement policies and record academic approvals and benchmarks
 - Maintain the budget for and distribute all forms of graduate financial aid, including GRAs, GTAs, fellowships, etc.
 - Facilitate the Graduate Studies Committee (a curriculum and academic policy committee of faculty and graduate students)
 - Gathers, reviews, and reports on graduate student data
 - In collaboration with the Provost's Office and appropriate accreditation bodies, responsible for graduate programs assessment and accreditation
 - Works with the Dean of Students to support students with emotional and/or academic difficulties
 - Lead a UVA Engineering Board of Trustees Working Group for Graduate Education & Recruitment.

Director of Graduate Training

2014 – 2016

Department of Biomedical Engineering, Georgia Institute of Technology, Atlanta GA

Responsibilities/Accomplishments/Innovations:

- Part of leadership team for a graduate program that spans multiple degree options, multiple institutions and multiple countries. Faculty, students, and resources are distributed across these multiple entities and must be coordinated and organized.
 - The primary PhD program is a joint one between Georgia Institute of Technology and Emory University School of Medicine
 - The BME graduate program also includes a PhD option that is joint between Georgia Institute of Technology, Emory University School of Medicine, and Peking University in Beijing China.
 - Finally, the BME graduate program also includes a Masters of Biomedical Innovation and Development
- Leading an effort to implement more professional development training and opportunities into the graduate program. So far, these efforts include developing a Professional Development Seminar Series,

and a student seminar series, whereby students present their research for constructive feedback to fellow students, faculty, and industry experts. I have also inserted various professional development training, both instructional and hands-on, within the existing BME graduate curriculum.

- Designed and instruct new courses in the graduate curriculum: Teaching & Research Practicum I & II. Each graduate student takes these courses during their time as teaching assistants. In these courses, students learn about and implement various active-learning teaching strategies. Ethical training, as well as professional development, will also be included.
- Reorganized and manage the teaching assistant process for both graduate and undergraduate students. Have formalized the training and assignment process, and designed and implemented forms to facilitate discussion regarding expectations and obligations between teaching assistants and instructors. Also designed and implemented formal evaluations of teaching assistant performance at the end of each semester. Have sole responsibility for the Teaching Assistant budget from the department.
- Overhauled the RCR program with the BME curriculum so that RCR content is taken over the course of the curriculum, being taught through multiple stand-alone courses and within existing biomedical engineering courses.
- Redesigned the graduate program portion of the departmental website, including the MyBME site where current students can access milestone, curriculum, and administration information.
- Participate in graduate student recruitment both in-house and at various conferences
- Redesigning the graduate curriculum, incorporating new tracks that more closely follow new concentrations within the department.
- Ensure ethics training is carried out appropriately within the graduate curriculum. Am a member of the Georgia Institute of Technology Responsible Conduct of Research committee.
- Created, organized, and hosted the first BME Graduate Student Awards in the Spring of 2015.

Lecturer

2010 – 2014

Department of Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA

- Instructor: Systems Physiology
 - Designed new format for what was a lecture-heavy course, incorporating applicational activities such as clinical case studies, quantitative problems, current topics, group projects, and journal article reviews
 - Most recent scores on course evaluations: received a score of 4.00 or higher on 11 out of 13 metrics, with six of those scores being 4.50 or higher
- Instructor: Cellular & Molecular Physiology

- Designed new format for what was a lecture-heavy course, incorporating group projects where fundamental cell biology knowledge is applied to biomedical problem solving. In this design, students learn how to formulate rational and complete hypotheses, formulate logical experimental designs to address these hypotheses, and learn to communicate their rationale effectively both written and orally
- Most recent scores on course evaluations: received a score of 4.00 or higher on 9 out of 13 metrics

➤ Facilitator: Problem-Based Learning

Association for Prevention Teaching & Research Fellow **2007 – 2009**

Centers for Disease Control and Prevention, Atlanta, GA

Contractor **Summer 2007**

Economic Development Institute, Georgia Institute of Technology, Atlanta

Post-doctoral Fellow **2004 – 2006**

Laboratory of Patrick Aebischer, Ecole Polytechnique Federale de Lausanne, Switzerland

Post-doctoral Fellow **2002 - 2004**

Laboratory of Jeffrey Chamberlain, University of Washington, Seattle

Graduate Assistant **1998 - 2002**

Gene Therapy Center, University of Alabama at Birmingham

ACADEMIC SERVICE

- VA-NC Alliance Bridge to the Doctorate Advisory Board, October 2018 - present
- Provost Committee on the Future of Graduate Education, November 2018 - present
- EngineeringCAS Advisory Board, January 2018 - present
- UVA Provost Committee on Graduate Policy, May 2018 - present
- Chair of the Graduate Education and Innovation Working Group within the UVA Engineering Board of Trustees, September 2016 – present
- Chair of the UVA Engineering Graduate Student Success Working Group, May 2018 – present
- Chair of the UVA Engineering Graduate Recruitment Committee, Sept 2016 - present
- UVA Entrepreneurship Advisory Committee, June 2017 - present
- UVA Engineering Assessment Committee, September 2017 - present
- UVA Engineering Graduate Studies Committee, September 2016 – present
- University of Virginia Graduate Affairs Network, September 2016 – present
- UVA PhD Plus Advisory Committee, December 2016 - present
- Georgia Tech BME Undergraduate Committee: member, June 2013 – August 2016
- Georgia Tech BME Undergraduate Awards Committee: member, Feb 2014 – August 2016
- Georgia Tech BME Graduate Committee: June 2014 – August 2016

- Georgia Tech RCR Advisory Committee: June 2014 – August 2016
- Leadership Board for the Emory School of Medicine MD/PhD program: October 2014 - August 2016

TEACHING AWARDS

- Gandy-Diaz Teaching Mentor, 2016
- Outstanding Teacher of the Year (2014), awarded by the Biomedical Engineering Student Advisory Board, Georgia Tech
- Thank-A-Teacher (every year, 2011-2014), student-nominated, Center for the Enhancement of Teaching and Learning, Georgia Tech

EARNED DEGREES

Ph.D. Biomedical Engineering, University of Alabama at Birmingham, Birmingham, AL, 2002
Mentor: David Curiel PhD/MD, dcuriel@radonc.wustl.edu, 317-747-5443

M.S. Biomedical Engineering, University of Alabama at Birmingham, Birmingham, AL, 2001

B.S. Biology, Valdosta State University, Valdosta, GA, 1996

REFEREED PUBLICATIONS

1. LV Kalman, JC Tarleton, AK Percy, S Aradhya, S Bale, **SD Barker**, P Bayrak-Toydemir, C Bridges, AM Buller-Burckle, S Das, RK Iyer, TD Vo, VV Zvereff, LH Toji (2014), Development of a genomic DNA reference material panel for Rett Syndrome (*MECP2*-related disorders) genetic testing. *J Mol Diagn* 16: 273.
2. L Kalman, IR Lubin, **S Barker**, D du Sart, R Elles, WW Grody, M Passagli, S Richards, I Schrijver, B Zehnbauser (2013), Current landscape and new paradigms of proficiency testing for molecular genetics. *Archives of Pathology and Laboratory Medicine* 137:983.
3. **SD Barker**, S Bale, J Booker, A Buller, S Das, K Friedman, AK Godwin, WW Grody, E Highsmith, JA Kant, E Lyon, R Mao, KG Monaghan, DA Payne, VM Pratt, I Schrijver, AE Shrimpton, E Spector, M Telatar, L TOji, K Weck, B Zehnbauser, LV Kalman (2009), Development and characterization of reference materials for MTHFR, SERPINA1, RET, BRCA1, and BRCA2 genetic testing. *J Mol Diagn* 11(6):553-561.
4. VM Pratt, M Caggana, A Buller, C Bridges, WE Highsmith, EM Rohlfes, J Tarleton, L Toji, **SD Barker**, LV Kalman, Development of genomic reference materials for cystic fibrosis genetic testing, *J Mol Diagn* 11(3):186-193.
5. **Barker S** (2006), NIH directors encouraged about direction of research. *BioWorld* 17(204):1.
6. Raoul C, **Barker SD**, Aebischer P (2006), Viral-based modeling and correction of neurodegenerative diseases by RNA interference. *Gene Therapy* 13:487-95
7. Ono HA, Davydova JG, Adachi Y, Takayama K, **Barker SD**, Reynolds PN, Krasnykh VN, Kunisaki C, Shimada H, Curiel DT, Yamamoto M (2005), Promoter-controlled infectivity-enhanced conditionally replicative adenoviral vectors for the treatment of gastric cancer. *J Gastroenterol* 40:31-42

8. Zhu ZB, Makhija SK, Lu B, Wang M, Kaliberova L, Liu B, Rivera AA, Netterlback DM, Mahasreshti PJ, Leath CA, **Barker S**, Yamamoto M, Li F, Alvarez RD, Curiel DT (2004), Transcriptional targeting of tumors with a ovel tumor-specific surviving promoter. *Cancer Gene Therapy* 11(4):256-62.
9. **Barker SD**, Dmitriev IP, Nettelbeck DM, Liu B, Rivera AA, Alvarez RD, Curiel DT, Hemminki A (2003), Combined transcriptional and transductional targeting improves the specificity and efficacy of adenoviral gene delivery to ovarian carcinoma. *Gene Therapy* 10:1198-204
10. Lam JT, Bauerschmitz GJ, Kanerva A, **Barker SD**, Straughn JM, Wang M, Barnes MN, Blackwell JL, Siegal GP, Alvarez R, Curiel DT, Hemminki A (2003), Replication of an integrin targeted conditionally replicating adenovirus on primary ovarian cancer spheroids. *Cancer Gene Therapy* 10:377-87
11. **Barker SD**, Coolidge CJ, Kanerva A, Hakkarainen T, Yamamoto M, Liu B, Rivera AA, Bhoola SM, Barnes, MN, Alvarez RD, Curiel DT, Hemminki A (2003), The secretory leukoprotease inhibitor (SLPI) promoter for ovarian cancer gene therapy. *J Gene Med* 5:300-10
12. Nagi P, Vickers SM, Davydova J, Adachi Y, Takayama K, **Barker S**, Krasynk V, Curiel DT, Yamamoto M (2003), Development of a therapeutic adenoviral vector for cholangiocarcioma restricted gee expression and infectivity enhancement. *J Gastrointest Surg* 7(3):364-71.
13. Hakkarainen T, Hemminki A, Pereboev AV, **Barker SD**, Asiedu CK, Strong TV, Kanerva A, Wahlfors J, Curiel DT (2003), CD40 is expressed on ovarian cancer cells and can be utilized for targeting adenoviruses. *Clin Cancer Res* 9:619-24
14. Bauerschmitz GJ, **Barker SD**, Hemminki A (2002), Adenoviral gene therapy for cancer: from vectors to targeted and replication competent agents. *Int J Oncol* 21:1161-74
15. Arafat WO, Gomez-Navarro J, Buchsbaum DJ, Xiang J, Wang M, Casado E, **Barker SD**, Mahasreshti PJ, Haisma HJ, Barnes MN, Siegal GP, Alvarez RD, Hemminki A, Nettelbeck DM, Curiel DT (2002), Effective single chain antibody (scFv) concentrations in vivo via adenoviral vector mediated expression of secretory scFc. *Gene Therapy* 9:256-62
16. Kanerva A, Mikheeva GV, Krasnykh V, Coolidge CJ, Lam JT, Mahasreshti PJ, **Barker SD**, Straughn M, Barnes MN, Alvarez RD, Hemminki A, Curiel DT (2002), Targeting adenovirus to the serotype 3 receptor increases gene transfer efficiency to ovarian cancer cells. *Clin Cancer Res* 8:275-80
17. Casado E, Gomez-Navarro J, Yamamoto M, Adachi Y, Coolidge CJ, Arafat WO, **Barker SD**, Wang MH, Mahasreshti PJ, Hemminki A, Gonzalez-Baron M, Barnes, MN, Pustilnik TB, Seigal GP, Alvarez RD, Curiel DT (2001), Strategies to accomplish targeted expression of transgenes in ovarian cancer for molecular therapeutic applications. *Clin Cancer Res* 7:2496-504
18. **Barker SD**, Casado E, Gomez-Navarro J, Xiang J, Arafat W, Mahasreshti P, Pustilnik TB, Hemminki A, Seigal GP, Alvarez RD, Curiel DT (2001), An immunomagnetic-based method for the purification of ovarian cancer cells from patient-derived ascites. *Gynecol Oncol* 82:57-63
19. Xiang J, Gomez-Navarro J, Arafat W, Liu B, **Barker SD**, Alvarez RD, Siegal GP, Curiel DT (2000), Pro-apoptotic treatment with an adenovirus encoding Bax enhances the effect of chemotherapy in ovarian cancer. *J Gene Med* 2:97-106