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## BIOGRAPHICAL SKETCH

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NAME <b>ARUL JAYARAMAN</b>	POSITION TITLE <b>Associate Professor, Chemical Engineering and Biomedical Engineering</b>		
eRA COMMONS USER NAME <b>1JAYARAMAN</b>			
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
Birla Institute of Technology & Science, India	B.E	1992	Chemical Engineering
Birla Institute of Technology & Science, India	M.Sc	1992	Physics
Tufts University	M.S	1994	Biochemical Engineering
University of California, Irvine	Ph.D	1998	Biochemical Engineering
Massachusetts General Hospital	Postdoc	2000	Biomedical Engineering

### A. Personal Statement

Research in my laboratory focuses on inter-domain signaling between bacteria and human cells in complex, multi-signal environments, with the goal of identifying design principles underlying recognition of non-canonical signals. Specifically, we focus on inter-domain signal recognition in different aspects of GI tract infections and inflammation. Work in my laboratory is highly inter-disciplinary in nature and involves development of novel microscale model systems for investigating bacterial chemotaxis and bacterial community and biofilm development, prediction and identification of microbiota metabolites, and dynamic monitoring and modeling of transcription factor activation. A key aspect of my research program at Texas A&M is that we focus on the effect of microbiota metabolites and eukaryotic signals on both bacteria and host cells to derive a system-level understanding of molecular signaling events at the bacteria-host cell interface. My lab has ongoing collaborations that have led to identification of mechanisms underlying sensing of non-canonical signals such as the autoinducer-2 (AI-2) by enteric bacteria and the discovery that the microbiota-derived metabolite indole modulates host cell inflammation.

### B. Positions and Honors.

#### Positions

1992-1993	Fermentation Engineer, Madurai Kamaraj University, India
1998-2000	Research Fellow in Surgery, Shriners Burns Hospital, Boston
2000-2003	Instructor in Surgery (Bioengineering), Harvard Medical School, Boston
2001-2003	Principal Investigator, Shriners Burns Hospital, Boston
2004-2010	Assistant Professor, Dept. of Chemical Engineering, Texas A&M University
2010 -	Associate Professor, Dept. of Chemical Engineering, Texas A&M University

#### Awards and Honors

1994	Dean's Fellowship, University of California, Irvine
1998	U.C. Regents Dissertation Fellowship, University of California, Irvine
2009	NSF CAREER Awardee
2009	Ray Nesbitt I Faculty Development Professorship
2010	TEES Select Young Faculty Award
2011	Celanese Teaching Excellence Award

#### Professional Memberships

American Society of Microbiology  
American Chemical Society  
American Institute of Chemical Engineers

### C. Selected peer-reviewed publications (out of 69 total)

#### Relevant

1. Hong, S., Hegde, M., Kim, J., **Jayaraman, A.**<sup>#</sup> and Wood, T. K.<sup>#</sup>. "Synthetic quorum sensing circuit to control consortial biofilm formation and dispersal in a microfluidic device". *Nature Communications*. Accepted (2011). <sup>#</sup>: Joint corresponding authors.
2. Hegde, M., Englert, D. L., Schrock, S., Cohn, W. B., Vogt, C., Wood, T. K., Manson, M. D. and **Jayaraman, A.** "Chemotaxis to the quorum sensing signal AI-2 requires the Tsr chemoreceptor and the periplasmic LsrB AI-2 binding protein". *Journal of Bacteriology*. 193: 768-73 (2011).
3. Englert, D. L.<sup>\*</sup>, Manson, M. D. and **Jayaraman, A.** "A Microfluidic ( $\mu$ Flow) method for quantifying bacterial chemotaxis". *Nature Protocols*. 5: 864-72 (2010).
4. Englert, D. L.<sup>\*</sup>, Adase, C., **Jayaraman, A.** and Manson, M. D. "Repellent Taxis to Nickel Ion Requires Neither Ni<sup>2+</sup> Transport nor the Periplasmic NikA Binding Protein". *Journal of Bacteriology*. 192: 2633-7 (2010). PMC2863559
5. Kim, J.<sup>\*</sup>, Hegde, M.<sup>\*</sup> and **Jayaraman, A.** "Co-culture of bacteria and epithelial cells for investigating signal-mediated interactions in the GI tract". *Lab Chip* 10: 43-50 (2010).

#### Representative

1. Bansal, T., Alaniz, R., Wood, T. K. and **Jayaraman, A.** "The bacterial signal indole increases transepithelial resistance and attenuates epithelial cell inflammation". *Proceedings of the National Academy of Sciences*. 107: 228-33 (2010). PMC2806735
2. Englert, D. L., **Jayaraman, A.** and Manson, M. D. "Microfluidic techniques for the analysis of bacterial chemotaxis". *Methods in Molecular Biology*. 571: 1-23 (2009).
3. Englert, D. L., Manson, M. D. and **Jayaraman, A.** "Using a microfluidic device to investigate interactions between signaling molecules on *Escherichia coli* chemotaxis". *Applied and Environmental Microbiology*. 75: 4557-64 (2009). PMC2704821
4. Englert, D. L.<sup>\*</sup>, Janakiraman, V., **Jayaraman, A.**<sup>#</sup> and Baskaran, H.<sup>#</sup>. "Modeling growth and quorum sensing in biofilms grown in microfluidic chambers". *Annals of Biomedical Engineering*. 37: 1206-16 (2009). <sup>#</sup>: Joint corresponding authors
5. Hegde, M., Wood, T. K. and **Jayaraman, A.** "The neuroendocrine hormone norepinephrine increases *Pseudomonas aeruginosa* PA14 virulence through the *las* quorum sensing pathway". *Applied Microbiology and Biotechnology*. 84: 763-6 (2009).
6. **Jayaraman, A.** and Wood, T. K. "Bacterial quorum sensing: Signals, circuits, and implications for biofilms and disease". *Annual Reviews of Biomedical Engineering*. 10: 145-167 (2008).
7. Lee, J., Zhang, X.S., Hegde, M., Bentley, W. E., **Jayaraman, A.** and Wood, T. K. "Indole cell signaling occurs primarily at low temperatures in *Escherichia coli*". *ISME Journal*. 2: 1007-23 (2008).
8. Bansal, T., Jesudhasan, P., Pillai, S., Wood, T. K. and **Jayaraman, A.** "Temporal regulation of enterohemorrhagic *Escherichia coli* virulence mediated by autoinducer-2". *Applied Microbiology & Biotechnology*. 78: 811-9 (2008).
9. Bansal, T., Englert, D., Lee, J., Hegde, M., Wood, T. K. and **Jayaraman, A.** "Differential effects of epinephrine, norepinephrine, and indole on *Escherichia coli* O157:H7 chemotaxis, colonization, and gene expression". *Infection & Immunity*. 75: 4597-607 (2007). PMC1951185
10. Lee, J., **Jayaraman, A.** and Wood, T. K. "Indole is an inter-species signal mediated by SdiA". *BMC Microbiology* 7: 42 (2007). PMC1899176