

Premal Shah

Department of Genetics
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EDUCATION

2011 **Ph. D. Ecology and Evolutionary Biology**
University of Tennessee, Knoxville TN
Advisor: Dr. Michael A. Gilchrist

2006 **B. Tech. Biotechnology**
Anna University, Chennai, India
Advisor: Dr. Gautam Pennathur

PROFESSIONAL APPOINTMENTS

2016–Current **Assistant Professor of Genetics**
Rutgers University, New Brunswick NJ

2011–2015 **Postdoctoral Fellow**
University of Pennsylvania, Philadelphia PA
Advisor: Dr. Joshua B. Plotkin

2009–2011 **Graduate Research Assistant**
National Institute for Mathematical and Biological Sciences
University of Tennessee, Knoxville TN

2006–2009 **Graduate Teaching Assistant**
Department of Ecology and Evolutionary Biology
University of Tennessee, Knoxville TN

2006 **Undergraduate Researcher**
Institute for Mathematical Sciences, Chennai, India

2004 **Summer Research Fellow**
Indian Institute of Sciences, Bangalore, India

PUBLICATIONS

2016 Weinberg DE*, **Shah P***, Eichhorn SW, Hussmann JA, Plotkin JB, and Bartel DP.
Improved ribosome-footprint and mRNA measurements provide insights into dynamics and regulation of yeast translation.
Cell Reports In Press *Equal contribution

2016 Kubatko L, **Shah P**, Herbei R, and Gilchrist MA.
A codon model of nucleotide substitution with selection on synonymous codon usage.
Molecular Phylogenetics and Evolution In Press

2015 **Shah P**, McCandlish DM, and Plotkin JB.
Contingency and entrenchment in protein evolution under purifying selection.
Proceedings of the National Academy of Sciences, USA E3226–E3235

2015 Gilchrist MA, Chen WC, **Shah P**, Landerer C, and Zaretzki R.
Estimating gene expression and codon specific translational efficiencies, mutation biases, and selection coefficients from genomic data alone.

- 2014 Fordyce JA, **Shah P**, and Fitzpatrick BM.
iteRates: An R package for implementing a parametric rate comparison on phylogenetic tree.
Evolutionary Bioinformatics (10): 127-130
- 2013 **Shah P**, Ding Y, Niemczyk M, Kudla G, and Plotkin JB.
Rate-limiting steps in yeast protein translation.
Cell 153 (7): 1589-1601
- 2013 Xu Y, Ma P, **Shah P**, Rokas A, Liu Y and Johnson CH.
Non-optimal codon usage is a mechanism to achieve circadian clock conditionality.
Nature 495: 116-120
- 2013 McCandlish DM, Rajon E, **Shah P**, Ding Y and Plotkin JB.
The role of epistasis in protein evolution.
Nature 497: E1-E2
- 2013 **Shah P**, Fitzpatrick BM, and Fordyce JA.
A parametric method for assessing diversification rate variation in phylogenetic trees.
Evolution 67 (2): 368-377
- 2013 Niemiller ML, Fitzpatrick BM, **Shah P**, Schmitz L, and Near TJ.
Evidence for repeated loss of selective constraint in rhodopsin of amblyopsid cavefishes (Teleostei: Amblyopsidae).
Evolution 67 (3): 732-748
- 2012 Ding Y, **Shah P** and Plotkin JB.
Weak 5' mRNA structure in short eukaryotic genes.
Genome Biology and Evolution 4 (10): 1046-1053
- 2011 **Shah P**, and Gilchrist MA.
Explaining complex codon usage patterns with selection for translational efficiency, mutation bias, and genetic drift.
Proceedings of the National Academy of Sciences, USA 108 (25): 10231-6
- 2010 **Shah P**, and Gilchrist MA.
Effect of correlated tRNA abundances on translation errors and evolution of codon usage bias.
PLOS Genetics 6 (9): e1001128
- 2010 **Shah P**, and Gilchrist MA.
Is thermosensing property of RNA thermometers unique?
PLOS ONE 5 (7): e11308
- 2009 Gilchrist MA, **Shah P**, and Zaretzki R.
Measuring and detecting molecular adaptation in codon usage against nonsense errors during protein translation.
Genetics 183 (4): 1493-505

HONORS AND AWARDS

- 2011 Jim Tanner Award for Outstanding Dissertation.
- 2009-2011 National Institute for Mathematical and Biological Synthesis (NIMBioS) Graduate Research Assistantship (\$20,000 p.a.).
- 2009-2010 EEB Summer Research Grant.
- 2009-2010 EEB Travel Award.
- 2010 College of Arts and Sciences, UTK Travel Award.
- 2009-2010 Graduate Researchers in Ecology, Behavior and Evolution Travel Grant.
- 2009 University of Tennessee Graduate Summer Research Assistantship (\$3,600).
- 2004 Indian Academy of Sciences, Summer Research Fellowship.
- 2000 National Scholarship from the Central Board of Secondary Education, New Delhi awarded to top 0.01% in Mathematics at the National level.

INVITED TALKS

- 2015 *Opportunities and pitfalls in modeling protein translation using ribosome-profiling.*
Tel Aviv University, Tel Aviv, Israel
- 2015 *Insights from mechanistic models of protein translation.*
University of Maryland, Baltimore County, MD
- 2015 *Insights from mechanistic models of protein translation.*
Rutgers University, New Brunswick NJ
- 2014 *Dynamics of protein translation in yeast.*
National Center for Biological Sciences, Bangalore, INDIA
- 2013 *Rate-limiting steps in protein translation.*
University of Utah, Salt Lake City UT
- 2011 *Population genetics of codon usage bias.*
University of Pennsylvania, Philadelphia PA
- 2011 *Insights from mechanistic models of protein translation on the evolution of codon usage bias.*
Vanderbilt University, Nashville TN
- 2009 *Measuring the adaptedness of a gene: Nonsense-error Adaptation Index.*
University of Tennessee, Knoxville TN
- 2006 *Agent-based models in economics.*
Computable and Experimental Economics Laboratory (CEEL), Trento, Italy

CONFERENCE PRESENTATIONS

- 2015 **Shah P** and Plotkin JB.
Opportunities and pitfalls in modeling protein translation using ribosome-profiling.
Society for Molecular Biology and Evolution (SMBE) - Vienna, Austria.
- 2015 **Shah P**, McCandlish DM and Plotkin JB.
Contingency and entrenchment in protein evolution.
Forecasting evolution - Lisbon, Portugal.
- 2015 **Shah P** and Plotkin JB.
Dynamics and regulation of protein translation.
Biomedical Postdoc Research Symposium - Philadelphia, PA.
- 2015 **Shah P** and Plotkin JB.
Local DNA topography predicts genomic mutation rates.
Society for Molecular Biology and Evolution (SMBE) - Bloomington, IN.
- 2014 **Shah P**, Krishnan A, Gilchrist MA and Plotkin JB.
Redefining the context in context-dependent mutation.
Society for Molecular Biology and Evolution (SMBE) - San Juan, PR.

- 2014 **Shah P**, Krishnan A, Gilchrist MA and Plotkin JB.
Redefining the context in context-dependent mutation.
Society for Study of Evolution (SSE) - Raleigh, NC.
- 2013 **Shah P** and Plotkin JB.
Characterizing epistasis in proteins under purifying selection.
Society for Molecular Biology and Evolution (SMBE) - Chicago, IL.
- 2013 **Shah P** and Plotkin JB.
Characterizing epistasis in proteins under purifying selection.
Society for Study of Evolution (SSE) - Salt Lake City, UT.
- 2010 **Shah P** and Gilchrist MA.
Correlated tRNAs, translation errors and evolution of codon usage bias.
Society for Molecular Biology and Evolution (SMBE) - Lyon, France.
- 2010 **Shah P** and Gilchrist MA.
Correlated tRNAs, translation errors and evolution of codon usage bias.
Society for Study of Evolution (SSE) - Portland, OR.
- 2010 **Shah P** and Gilchrist MA.
Genome-wide determinants of codon composition.
SouthEastern Population Ecology and Evolutionary Genetics (SEPEEG) - Madison, FL.
- 2009 Gilchrist MA, **Shah P**, and Zaretzki R.
Making Wright's metaphor a reality: Quantifying and detecting molecular adaptation.
Society for Study of Evolution (SSE) - Moscow, ID.
- 2009 Gilchrist MA, **Shah P**, and Zaretzki R.
Making Wright's metaphor a reality: Quantifying and detecting molecular adaptation.
SouthEastern Population Ecology and Evolutionary Genetics (SEPEEG) - Dahlenega, GA.
- 2009 Gilchrist MA, **Shah P**, and Zaretzki, R.
Measuring and detecting molecular adaptation against nonsense errors.
The 7th Georgia Tech - Oak Ridge National Lab International Conference – "Genome Biology and Bioinformatics" - Atlanta, GA.
- 2009 **Shah P**, Strielkowski W, and Sinha, S.
Mechanisms of immigrants' clusters formation using networks dynamic modeling.
Santa Fe Institute - Summer Complex Systems School, Chennai, India.

PROFESSIONAL SERVICE

Reviewer

Nature	Genome Research
Nature Structural & Molecular Biology	Molecular Biology & Evolution
Nature Molecular Systems Biology	Genome Biology & Evolution
Nature Communications	Evolution
Cell Reports	RNA
EMBO Reports	Journal of Theoretical Biology
PLOS Biology	Journal of Molecular Evolution
PLOS Computational Biology	Current Bioinformatics
PLOS ONE	Biotechnology Journal

PROFESSIONAL AFFILIATIONS

Society for Study of Evolution (SSE)
Society for Molecular Biology and Evolution (SMBE)
RNA Society

TEACHING EXPERIENCE**Graduate Teaching Assistant:**

2007 Genetics

2006 Biology for non-majors

Guest Lecturer:

2010 Biometry – Introduction to bayesian inference.

2010 Evolution in society – Explaining genomic patterns in the light of evolution.

2008 Genetics – Codon usage bias: evolution and consequences.

OUTREACH EXPERIENCE

2010-2011 NIMBioS Teacher Collaboration Program.

2010 Undergraduate Mentor in Society for Molecular Biology and Evolution (SMBE) Mentorship Program.

2007-2009 Member of Organizing committee for Darwin Day.

2009 Mentor: NIMBioS Undergraduate Research Conference.