CURRICULUM VITAE
PALLAV KOSURI

Postdoctoral fellow
Harvard University
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Department of Chemistry and Chemical Biology

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EDUCATION

Ph.D. *with distinction*, Biochemistry and Molecular Biophysics, 2006-2012
Columbia University, New York

- Thesis title: "Mechanochemical Methods for Single Molecule Biochemistry"
- Thesis adviser: Julio M. Fernandez, Department of Biological Sciences

M.Sc., Engineering Physics, 2001-2005
Royal Institute of Technology (KTH), Stockholm, Sweden

Thesis research at the European Center for Nuclear Research (CERN), Geneva, Switzerland

- Thesis title: "Operation and Development of a Resonant Ionization Laser Ion Source"
- Thesis advisers: Lars-Erik Berg (KTH), Valentin N. Fedosseev (CERN)

Supplementary coursework:

- Molecular Biology & Neuroscience, Karolinska Institutet
- Psychology, Stockholm University

HONORS AND AWARDS

Columbia University distinction award for doctoral defense, 2012
Titus M. Coan Prize for Excellence in Basic Research, 2012
Columbia Technology Ventures Validation Fund Award, 2011
Fulbright Scholarship, 2006-2011
Henrik Göransson Sandviken Foundation Scholarship, 2005

RESEARCH EXPERIENCE

Columbia University

Lab of Julio Fernandez, 2007-2013

- Research in protein biochemistry using single-molecule force spectroscopy
- Helped develop a commercial Atomic Force Microscope, available through Luigs&Neumann GmbH

Lab of Eric Greene, rotation, 2007

- Constructed dual optical tweezers for use in single molecule studies of DNA repair proteins

Lab of Ruben Gonzalez, rotation, 2007

- Developed rigorous methods for analysis of single-molecule FRET data

Lab of Arthur Palmer, rotation, 2006

- Assigned NMR spectra in order to test new relaxation dispersion methods

European Center for Nuclear Research (CERN)

The ISOLDE nuclear experiment facility for on-line isotope separation, M.S. thesis work, 2005

- Operation of the Resonant Ionization Laser Ion Source (RILIS) during nuclear experiments; Development of a technical upgrade of the laser ion source; Theoretical study of laser ionization spectroscopy of atomic gold for nuclear experiments (currently in use)

TEACHING EXPERIENCE

Cellular Physiology of Disease W3008, Columbia University, 2010
Experimental Biophysics (Graduate Level), Tel Aviv University, 2009
Cellular Physiology of Disease W3008, Columbia University, 2008
Molecular Biophysics G4250, Columbia University, 2007

ACTIVITIES

InSITE Fellow, Entrepreneurship & Venture Capital strategy, New York, 2011-2013
Research Fellow, Columbia Technology Ventures, Technology Transfer, New York, 2010-2012
President, Graduate Student Organization, Columbia University Medical Center, New York, 2007-2008
Photojournalist (*http://www.pallavkosuri.com*), IDG Publishing, 2005-2006
Project leader, Nobel Nightcap (part of the Nobel Prize festivities), Stockholm, 2004
Diving coach, SK Neptun, Stockholm, 2004-2005

PRESENTATIONS (selected)

2014 Cambridge, MA — Physics of Living Systems, Harvard University (seminar)
Mechanical memory in muscle proteins

2014 Cambridge, MA — Bauer Forum, Center for Systems Biology, Harvard University (invited talk)
A single-molecule view of disulfide chemistry in proteins

2012 New York, NY — The New York Academy of Sciences speaker series (invited talk)
Leveraging the scientific mindset in the entrepreneurial world

2012 West Dover, VT — Gordon Research Conference (poster presentation)
Mechanisms of disulfide formation

2012 San Diego, CA — Biophysical Society Meeting (poster presentation)
Single molecule oxidative folding

2011 New York, NY — Dept. of Biochemistry and Molecular Biophysics, Columbia University (seminar)
A study of ancient enzymes using single-molecule AFM

2011 Baltimore, MD — Biophysical Society Meeting (poster presentation)
Unraveling the mechanisms of oxidative folding in single proteins

2010 Lucca, Italy — Gordon Research Conference (poster presentation)
Single atom switch of enzyme function during oxidative folding

2010 New York, NY — Dept. of Chemistry, Columbia University (seminar)
Direct observation of reduction and oxidation of single disulfide bonds

2010 San Francisco, CA — Biophysical Society Meeting (poster presentation)
Mechanism of disulfide reduction by the acidophilic reductase GILT

2009 New York, NY — Dept. of Biochemistry and Molecular Biophysics, Columbia University (seminar)
The life and death of a disulfide bond

PATENT APPLICATIONS

Force-clamp spectrometer and methods of use, US20130143248
Ancestral proteins, US2011044275

PUBLICATIONS

Work done by titin protein folding assists muscle contraction
Rivas-Pardo JA, Eckels EC, Popa I, Kosuri P, Linke WA, Fernandez JM
Cell Reports 14:1339-1347 (2016)

S-glutathionylation of cryptic cysteines enhances titin elasticity by blocking protein folding
Alegre-Cebollada J*, Kosuri P*, Giganti D, Eckels E, Rivas-Pardo JA, Hamdani N, Warren CM, Solaro RJ, Linke WA, Fernandez JM (*co-first authors)
Cell 156:1235-46 (2014) *cover story*

Picomolar amyloid-β peptides enhance spontaneous astrocyte calcium transients
Lee L, Kosuri P, Arancio O
Journal of Alzheimer's Disease 38:49-62 (2014)

Force dependency of biochemical reactions measured by single-molecule force-clamp spectroscopy
Popa I*, Kosuri P*, Alegre-Cebollada J, Garcia-Manyes S, Fernandez JM (*co-first authors)
Nature Protocols 8:1261-76 (2013)

Protein folding drives disulfide formation
Kosuri P, Alegre-Cebollada J, Feng J, Kaplan A, Ingles-Prieto A, Badilla C, Stockwell BR, Sanchez-Ruiz JM, Holmgren A, Fernandez JM
Cell 151:794-806 (2012)

Direct observation of disulfide isomerization in a single protein
Alegre-Cebollada J, Kosuri P, Rivas-Pardo JA, Fernandez JM
Nature Chemistry 3:882-7 (2011)

Protease power strokes force proteins to unfold
Alegre-Cebollada J, Kosuri P, Fernandez JM
Cell 145:339-340 (2011)

Single-molecule paleoenzymology probes the chemistry of resurrected enzymes
Perez-Jimenez R, Ingles-Prieto A, Zhao Z, Sanchez-Romero I, Alegre-Cebollada J, Kosuri P, Garcia-Manyes S, Kappock TJ, Tanokura M, Holmgren A, Sanchez-Ruiz JM, Gaucher EA, Fernandez JM
Nature Structural & Molecular Biology, 18:592-596 (2011)

Single-molecule force spectroscopy approach to enzymatic catalysis
Alegre-Cebollada J, Perez-Jimenez R, Kosuri P, Fernandez JM
Journal of Biological Chemistry, 285:18961-6 (2010)

Kalman filter estimates of the contour length of an unfolding protein in single-molecule force spectroscopy experiments
Fernandez VI, Kosuri P, Parot P, Fernandez JM
Review of Scientific Instruments 80:113104 (2009)

Partially folded equilibrium intermediate of the villin headpiece HP67 defined by ^{13}C relaxation dispersion
O'Connell NE, Grey MJ, Tang Y, Kosuri P, Miloushev VZ, Raleigh DP, Palmer AG
Journal of Biomolecular NMR, 45:85-98 (2009)

Diversity of chemical mechanisms in thioredoxin catalysis revealed by single-molecule force spectroscopy
Perez-Jimenez R, Li J, Kosuri P, Berne BJ, Fernandez JM
Nature Structural & Molecular Biology, 16:890-6 (2009)

Force-clamp spectroscopy detects residue co-evolution in enzyme catalysis
Perez-Jimenez R, Wiita AP, Rodriguez-Larrea D, Kosuri P, Gavira JA, Sanchez-Ruiz JM, Fernandez JM
Journal of Biological Chemistry, 283:27121-29 (2008)

Coupling of ribosomal L1 stalk and tRNA dynamics during translation elongation
Fei J, Kosuri P, MacDougall DD, Gonzalez RL
Molecular Cell, 30:348-359 (2008)

Development of a RILIS ionisation scheme for gold at ISOLDE, CERN
Marsh BA, Fedosseev VN, Kosuri P
Hyperfine Interactions, 171:109-116 (2006)