Curriculum Vitae **Jie Xiao**

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Research Objectives:

To take single molecule approaches into live cells to study the dynamics of cellular processes in real time. Current interests are in the areas of two-component signal transduction systems in *E. coli* and the assembly of the *E. coli* division complex.

Teaching Objectives:

To not only introduce fundamental concepts and recent advances in the areas of biochemistry, molecular biology and biophysics through interactive teaching style, but also to inspire and motivate students to develop critical thinking and problem-solving skills.

Education and Training:

2002- **Postdoctoral fellow, Department of Chemistry and Chemical Biology, Harvard University**
Advisor: Prof. X. Sunney Xie
Field: Single Molecule Biophysics

1997-2002 **Ph. D., Department of Biochemistry and Cell Biology**
Advisor: Prof. Scott F. Singleton
Field: Biochemistry and Molecular Biology
Thesis title: *Structural and kinetic characterization of the RecA-triple-stranded DNA complex: a key intermediate in the RecA-mediated strand exchange*

1995-1997 **Graduate research assistant, Department of Biochemistry, Nanjing University, P. R. China**
Advisor: Prof. Dexu Zhu
Field: Molecular Biology

1991-1995 **B.S., Department of Biochemistry, Nanjing University, Nanjing, P. R. China**
Bachelor thesis advisor: Prof: Enchong Tong
Field: Biochemistry and Molecular Biology

Honors and Awards:

2002 Student Research Advance Award, Biophysics Society 46th Annual Meeting, San Francisco, CA
2002 Student Travel Grant recipient, Biophysics Society 46th Annual Meeting, San Francisco, CA
1997-2000 Dean's Office Graduate Student Travel Award recipient, Rice University
2001 Honorable mention for poster and presentation, Keck Annual Research Conference
2000 Third place for poster and presentation, Keck Annual Research Conference, Houston, TX
1997-2000 Rice University Graduate Fellowship
1993-1995 People Fellowship, Nanjing University, P. R. China
1993 Yinsong Award, first place, Nanjing University, P. R. China

Professional Experience:

2002- **Department of Chemistry and Chemical Biology, Harvard University**
Postdotoral fellow. Advisor: Prof. X. Sunney Xie
Postdoctoral research topic: *probing gene expression in live E. coli cells: one molecule at a time*

Research focuses on developing a gene expression reporting system with single molecule sensitivity. By employing fluorescent dyes or variants of green fluorescent protein (GFP), protein molecules expressed from a highly suppressed gene are monitored one at a time in live *E. coli* cells. This research represents pioneering attempts in bringing single molecule fluorescence microscopy techniques into the study of live cells. Research reveals the stochastic nature of gene expression, with protein production occurs in random bursts and that the number of protein molecules in each burst is highly variable. Research leads to the quantification of gene expression patterns in live cells.

1997-2002 **Department of Biochemistry and Cell biology, Rice University**
Ph.D. candidate. Advisor: Prof. Scott F. Singleton
Pre-doctoral research topic: *Structural and kinetic characterization of the RecA-triple-stranded DNA complex: a key intermediate in the RecA-mediated strand exchange*

Research focused on the study of the mechanism of the *E. coli* RecA protein mediated DNA homologous

recombination process using fluorescently-labeled DNA substrates. Research led to the discovery that the three-stranded DNA (tsDNA) inside the RecA filaments adopts an extended but non-coplanar conformation. The formation of this RecA-tsDNA complex follows multiple steps kinetics and is driven by the intrinsic properties of the three DNA strands.

1997 **Department of Biochemistry and Cell Biology, Rice University**
Research assistant. Advisor: Prof. Kathleen M. Beckingham
Research Topic: *Conformational and metal-binding properties of androcam, a testis-specific calmodulin-related protein from Drosophila.*

1995-1996 **State Key Laboratory of Pharmaceutical Biotechnology, Department of Biochemistry, Nanjing University, P. R. China**
Graduate research assistant. Advisor: Prof. Dexu Zhu
Research topic: *Molecular cloning and characterization of the α and β units of hGM-CSF receptor*

1994-1995 **Department of Immunology, People's Hospital of Jiangsu Province, P. R. China**
Undergraduate Research assistant. Advisor: Prof. Enchong Tong
Research topic: *Antibody purification and characterization*

Teaching Experiences:

1999-2000 Department of Biochemistry and Cell Biology, Rice University
Teaching assistant (undergraduate Biochemistry class)

Talks and Presentations:

2005 Contributed talk, FASEB Summer Research Conference, Mechanisms & Regulation of Prokaryotic Transcription, Saxtons Rivers, VT
2004 Invited talk, Symposium of Biophysical Chemistry and Novel Imaging of Single Molecules and Single Cells, 228th ACS National Meeting, Philadelphia, PA
2004 Poster and presentation, Department of Energy Genome to Life Program, Washington D.C.
2004 Poster and presentation, Keystone Symposium, Bacterial Chromosomes, Santa Fe, NM
2003 Poster and presentation, 17th Protein Science Annual Meeting, Boston, MA
2002 Poster and presentation, Biophysical Society 46th Annual Meeting, San Francisco, CA
2001 Poster and presentation, FASEB Summer Research Conference, Genetic recombination and chromosome rearrangements, Snowmass, CO
2001 Poster and presentation, Biophysical Society 45th Annual Meeting, Boston, MA
2000 Poster and presentation, Keck 2000 Annual Research Conference, Houston, TX

Patent:

Xie XS., **Xiao J.**, Cai L., Markson JS., Yu J. *Compositions and methods for detection gene expression events in live cells, 2004.* Status: pending. Patent application number: 60/459,897

Publications:

1. Yu J., **Xiao J.,** (equal contributor), Ren X., Xie X.S., *Probing gene expression in live E. coli cells: one molecule at a time.* 2005, submitted to *Science*
2. **Xiao J.**, Singleton SF., *Elucidating a key intermediate in homologous DNA strand exchange: structural characterization of the RecA·triple-stranded DNA complex using fluorescence resonance energy transfer.* Journal of Molecular Biology, 2002 Jul 12;320(3):529-58
3. **Xiao J.**, Lee, A., Singleton SF. *Constructionand evaluation of a Kinetic scheme of RecA mediated DNA strand echange.* 2005, submitted to *Biopolymers*
4. Singleton SF., **Xiao J.**, *The Stretched DNA geometry of recombination and repair nucleoprotein filaments.* Biopolymers, 2001-2002;61(3):145-58
5. Lee A., **Xiao J.**, Singleton SF. The mechanistic strategy of homologous DNA strand exchange by the *E. coli* protein RecA: influence of homology disruption on the kinetics of sequence-specific DNA pairing. 2005, in preparation
6. Martin SR, Lu AQ, **Xiao J**, Kleinjung J, Beckingham K, Bayley PM., *Conformational and metal-binding properties of androcam, a testis-specific calmodulin-related protein from Drosophila.* Protein Science, 1999, Nov 8(11):2444-54

Society Memberships:

2004- American Chemical Association
2003- Protein Science Society
2000- Biophysical Society
1998- American Association for Advancement of Science

References:

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