Kurt Thorn

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EMPLOYMENT

October 2001 – Present: Research Fellow, Bauer Center for Genomics Research, Harvard University.
I run a lab, supervising 4 people. We are developing tools for measuring protein association in live cells and in real time. Our initial work has focused on applying fluorescence resonance energy transfer microscopy to measure dynamic protein interactions *in vivo* in *S. cerevisiae*. We are applying these tools to characterize the assembly dynamics and structure of the cytokinetic machinery of *S. cerevisiae*. We are also employing chemical genetic tools to decipher the regulation of cytokinesis in this system.

EDUCATION

UC San Francisco, Graduate Group in Biophysics. Ph.D. August 2001
Thesis: Structural elements of kinesin processivity at the single molecule level. Dr. Ronald D. Vale, advisor. Discovered a novel mechanism contributing to kinesin processivity using a combination of site-directed mutagenesis, single molecule motility assays, biochemistry, and computer modeling.

- Devised a novel protein purification technology based on the binding of bis-arsenical fluoresceins to cysteine-containing peptides.
- Created a web-searchable database of alanine-scanning mutations in proteins (www.asedb.org) and proposed a theory of protein-protein interactions.

Princeton University, Chemistry. A.B. June 1996.
GPA 3.78. Thesis: The 1.6 Å crystal structure of *Arabidopsis* profilin I. Advisor: Professor C.E. Schutt.

- Solved the structure of *Arabidopsis* profilin I *de novo* by MAD phasing.
- Learned a variety of crystallographic techniques, including multiwavelength anomalous diffraction, molecular replacement and multiple isomorphous replacement.

ADDITIONAL RESEARCH EXPERIENCE

Research Assistant, Structural Biology Department, Brookhaven National Laboratory, June – August of 1993 and 1994, in the laboratory of Dr. Robert M. Sweet.
Research Assistant, Department of Geophysical Sciences, University of Chicago, January 1991 – August 1992. Worked for Dr. M. L. Rivers at beamline X26A of the National Synchrotron Light Source, Brookhaven National Laboratory.

AWARDS AND HONORS

- HHMI Predoctoral Fellow
- A.B. with highest honors
- First place national winner in 1992 Westinghouse Science Talent Search. Project: "Elemental distributions in marine bivalves as measured by synchrotron x-ray fluorescence."

REFERENCES

Dr. Ronald Vale
Professor and Chair, Department of Cellular and Molecular Biology
Investigator, Howard Hughes Medical Institute
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PUBLICATIONS

Sheff, M.A., Fiske, B. P., Stepinac, T., and **Thorn, K.S.** Selection Of Optimal Fluorescent Protein Pairs For FRET Microscopy. In preparation.

Jones, S.L., **Thorn, K.S.**, and Guidotti, G. FRET Reveals The Dominant Form Of CD39 To Be A Monomer In Living Cells. In preparation.

Thorn K.S. and Sheff, M.A. Cell-Cycle Regulated Structural Dynamics Of The Septin Polymer. Submitted to *Nat.Cell Biol.*

Sheff, M.A. and **Thorn, K.S.** Optimized Cassettes For Fluorescent Protein Tagging In *Saccharomyces cerevisiae*. *Yeast,* **21**: 661-670, 2004.

Baniecki, M.L., McGrath, W.J., McWhirter, S. M., Li, C., Toledo, D.L., Pellicena, P., Bernard, D.L., **Thorn, K.S.**, and Mangel, W.F. Interaction Of The Human Adenovirus Protease With Its 11-Amino Acid Cofactor pVIc. *Biochem.* **40**: 12349-12356, 2001.

Thorn, K.S., and Bogan, A.A. ASEdb: A Database Of Alanine Mutations And Their Effects On The Free Energy Of Binding In Protein Interactions. *Bioinformatics* **17**: 284-285, 2001.

Thorn, K.S., Ubersax, J.A., and Vale, R.D. Engineering The Processive Run Length Of The Kinesin Motor. *J. Cell Biol.* **151**: 1093-1100, 2000.

Shimizu, T., **Thorn K.S.**, Ruby, A., and Vale, R.D. Kinetic And Single-Molecule Characterization Of Kinesin ATPase Mutants. *Biochem.* **39**: 5265 – 5273, 2000.

Thorn, K.S., Naber, N., Matuska, M., Vale R.D., and Cooke, R. A Novel Method Of Affinity Purifying Proteins Using A Bis-Arsenical Fluorescein. *Protein Sci.* **9**: 213 – 217, 2000.

Bogan, A.A. and **Thorn, K.S.** Anatomy of Hot Spots In Protein Interfaces. *J. Mol. Biol.* **280**: 1 – 9, 1998.

Lohman, T.M., **Thorn, K.**, and Vale, R.D. Staying On Track: Common Features Of DNA Helicases And Microtubule Motors. *Cell* **93**: 9 – 12, 1998.

Thorn, K.S., Christensen, H.E., Shigeta, R., Huddler, D. Shalaby, L, Lindberg, U., Chua, N.H., and Schutt, C.E. The Crystal Structure Of A Major Allergen From Plants. *Structure* **5**: 19 – 32, 1997.

Thorn, K., Cerrato, R.M., and Rivers, M.L. Elemental Distributions In Marine Bivalve Shells As Measured By Synchrotron X-Ray Fluorescence. *Biol. Bull.* **188**: 57 – 67, 1995.

Levine, A. J., Chang, A., Dittmer, D., Notterman, D.A., Silver, A., **Thorn, K.**, Welsh, D., and Wu, M. The P53 Tumor Supressor Gene. *J. Lab. Clin. Med.* **123**: 6, 1994.

Rivers, M.L., **Thorn, K.S.**, Sutton, S.R., Jones, K.W., and Bajt, S. Wavelength Dispersive Analysis With The Synchrotron X-Ray Fluorescence Microprobe. *Lunar Planet. Sci.* **XXIV**: 1203 – 1204, 1994.

PATENTS

Vale, R. D., **Thorn, K.**, Cooke, R., Matsuka, M., Naber, N., inventors; University of California, assignee. Method of affinity purifying proteins using modified bis-arsenical fluorescein. United States Patent 6,831,160

FUNDING

NIH Center of Excellence in Genomic Science Grant (1 P50 GM068763-01) "Modular biology: experiment, theory, and computation." Murray, A.W. et al. (including **Thorn, K. S.**, co-PI) $160K/yr. July 2003-2008.

INVITED TALKS

OPIA workshop, ASCB meeting (2004)
Genomics talk, Harvard University (2004)
Inaugural Systems Biology Retreat, Harvard Medical School (2004)
Genomics talk, Harvard University (2003)
Brookhaven National Lab Biology Department (2001)
American Chemical Society national meeting (2001)

LAB MEMBERS

Thomas Stepinac (2003 – 2005), postdoctoral fellow
Yi-Shiuan Liu (2004 –), postdoctoral fellow
Mark Sheff (2002 -), technician
Kwadwo Asare Oduro (2002 – 2004), undergraduate
Steven Williams (2003 – 2004), undergraduate
Jonathan Wing (2004 –), undergraduate
Brian Fiske (2004 –), undergraduate
Sutee Dee (2005), undergraduate