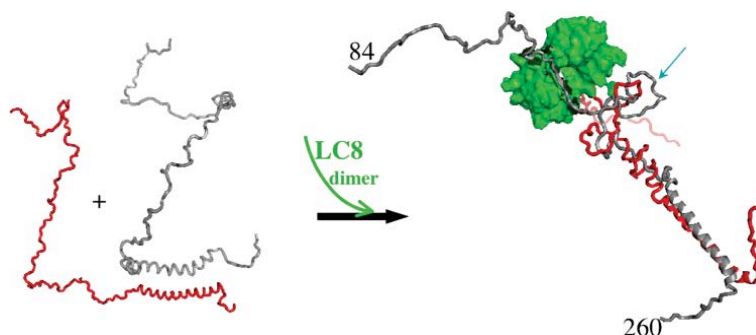


The Barbar lab had a very busy and productive year. The highlights include successful renewal of my NSF grant and invitations to present our work at national meetings.

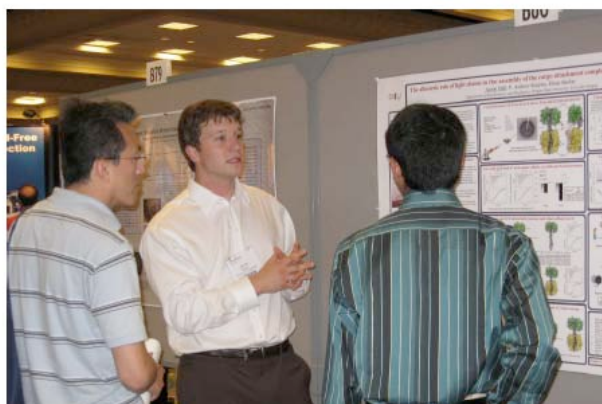
On the research front we have proposed a paradigm shifting idea that dynein light chain LC8 is not primarily a dynein subunit, but is an essential component of diverse protein complexes that play roles in a variety of cellular systems. The primary function of LC8 as a hub protein is to act as a dimerization facilitator in dynein and in all other complexes in which it participates, promoting the dimerization and ordering of the proteins with which it interacts.

Model for dimerization and structural organization of the intermediate chain IC (red and grey) associated with LC8 (green) binding. *Barbar, 08*



The NSF grant: Allosteric Role of Dynein Light Chains in Dynein Assembly and Regulation was awarded in July 08 for a 4 year duration. I was invited to give a talk in the Disordered Proteins subgroup at the Biophysical society meeting in Feb in Long beach, and in the Allosteric Regulation and Control session at the Protein Society meeting in July in San Diego. In the latter, postdoctoral Greg Benison and graduate students Justin Hall and Andrea Hall presented posters.

Justin Hall received the best poster award from the Protein Society. The award included a recognition certificate and more importantly a generous check.



## 2008 Publications

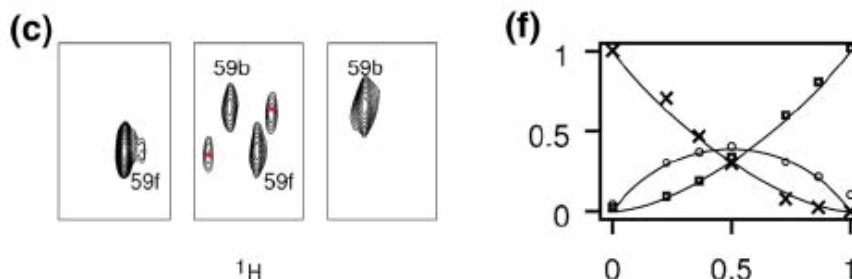
1. Benison G, Karplus PA, & **Barbar E.** (2008) The interplay of ligand binding and quaternary structure in the diverse interactions of dynein light chain LC8. *J Mol Biol.* **384**, 954-66. Epub 2008 Oct 11.
2. Hall J, Hall A, Pursifull N, & **Barbar E.** (2008) Differences in dynamic structure of LC8 monomer, dimer, and dimer-peptide complexes. *Biochemistry.* **47**, 11940-52. Epub 2008 Oct 23.
3. **Barbar E.** (2008) Dynein light chain LC8 is a dimerization hub essential in diverse protein networks. *Biochemistry.* **47**, 503-8. Epub 2007 Dec 20. This paper is a New Concept in Biochemistry, and was considered a **Hot Article**.

## Current lab members

*Greg Benison* (Summer 2005-present), an American Heart Association postdoctoral fellow has published this year a mechanism for cooperativity in LC8 binding based on crystal structures solved in our lab, as well as the first experimental evidence for such cooperativity.



*Benison et al, 2008*



*Afua Nyarko* (Feb 2008 - present) has expertise in characterization of disordered proteins primarily using ITC, FRET, and NMR.



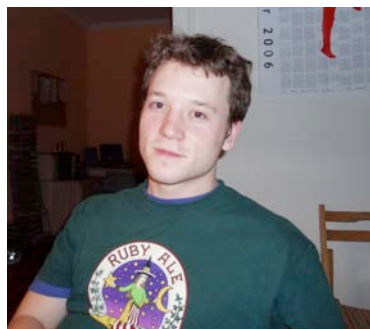
I was very pleased to recruit former graduate student Afua Nyarko to a postdoctoral position in my lab. Afua had a very successful two-year post-doc at the University of York in the UK before being drawn again to her first love, the dynein intermediate chain. Since her joining the lab, Afua has been instrumental in collecting crucial preliminary data for an NIH RO1 proposal. She is also writing her own proposal for postdoctoral fellowship.

*Yujuan Song* (Summer 2005 – present), research technician/lab manager



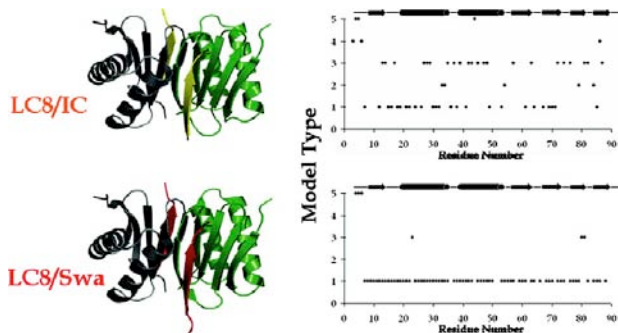
Yujuan is our molecular biology and protein expression expert, and the backbone of the lab, and we can all honestly admit that we can't do much without her. In addition to collecting data for my NIH RO1, Yujuan has collected very exciting data for a new paper that we are writing.

*Justin Hall* (Summer 2007 – present) is a 4<sup>th</sup> year graduate student.



While in my lab Justin has attended two prestigious conferences: The protein dynamics workshop in Summer 2007, where he gave a talk, and the protein society meeting in Summer 2008 where he won an award for the Best Poster by a graduate student.

Justin published his first paper in *Biochemistry* this Fall (Hall et al., 2008) that showed differences in binding among LC8 binding partners. Nathan Pursifull, a co-author on this paper, performed the folding experiments while an undergraduate student in the lab (BS 2002). Nathan graduated from Northwestern University School of Medicine, and is now a Urology Resident at UT Health Science Center, San Antonio, TX.



Andrea Hall (Summer 2007 – Summer 2008) is a 4<sup>th</sup> year graduate student.



Andrea is a student in Andy Karplus's group, that I co-advise, and who has spent the whole of last year in my lab. While in my lab she has also attended the protein dynamics workshop in Summer 2007, where she gave a talk, and the protein society meeting in Summer 2008.

Andrea and Justin had successfully presented their third year seminars and passed their orals. Andrea's first paper from my lab is being written for *Biochemistry*.

Christine Schneider (Fall 2008 – present) is a BB undergraduate major in the Honor's College.



Christine has received two research awards, a URISC and an Honor's college award. She is currently working with Afua on optimizing conditions for <sup>15</sup>N Leu selective labeling.

## Visitors

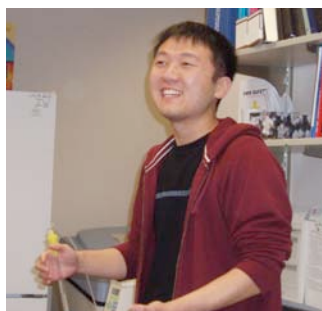
Our lab also had the pleasure of hosting several visiting speakers including *Michael Chapman* from OHSU, *Richard Kriwacki* from St Jude, *Jonathan Weissman* from UCSF, and *Wayne Bolen* from UTMB.

I had the honor and pleasure of working again with my former mentor *Clare Woodward* who stayed as a visiting professor in my lab the months of October and November, and her interactions with me and other lab members were very inspiring and reminded me of the joys (and trials!) of my post-doc years.

## Alumni News



At the Protein Society meeting in San Diego, I had the pleasure of uniting with my former graduate student, *Lei Wang*, who is now a postdoctoral researcher at the Burnham Institute (PhD, Dec 2003). She and her husband hosted us to a lovely Mongolian Hot Pot dinner. Lei is currently studying the development of the olfactory system, as a model system to understand the molecular mechanisms underlying neural circuit formation and regeneration.



*Peter Hsu* (BS 2007) is currently a graduate student in Chemistry at the University of Washington. He has spent Summer 2007-Spring 2008 performing research in our lab.



*Loren Cochrun* (BS 2004, Bioengineering) holding his son Ashton, who is 3 months old in this picture. Loren did undergraduate research in our lab and had incredibly good hands (as you see in the picture) that everything he did worked on the first trial. His work resulted in a paper in *Biochemistry* (Nyarko, Cochrun, et al., 2005). Loren is still working at GlySens in San Diego ([www.glysens.com](http://www.glysens.com)) as a process development engineer.

*Joan Steele* (BS Chem, 2002), now Joan Garrett finished her PhD in Chemistry in Fall 2007 from Ohio State University. She currently has a post-doctoral position in the lab of Carlos Arteaga at Vanderbilt University. Her project focuses on the discovery of mutations in the *ErbB2* gene that cause resistance to therapeutic small molecules that inhibit the ErbB2 receptor tyrosine kinase and the elucidation of the signaling properties of those mutants. Joan credits the time spent in our lab as igniting her interest in research and in playing a fundamental role in shaping her career goals.

*Serena Mills* who worked in our lab the Summer of 2007 as a Research Experience for Teachers fellow has moved up to Portland where her husband has a position at Freightliner. She will be applying to graduate schools at Portland State and OHSU.

More alumni news will be coming in the next newsletter. For now, I will end and wish you all a very fruitful and happy new year.