Currently teaching: Classical Mechanics

Teaching Interest: Teaching is a great opportunity for me to share my knowledge and experience with others. Personally, I find it very exciting to learn why something works a certain way, and enjoy sharing my excitement with students and colleagues. I consider myself a student. I am learning something new all the time. As I teach a subject I always find new things to learn, and often make direct connections with my research. I feel that this combination makes the academic environment special. In my lab, I enjoy teaching students and post doctorial researchers in an informal setting with many one-on-one conversations.

Teaching through Research: Active involvement in a research project is a great hands-on teaching tool to train a student how to deal with the unknown, and the unexpected. Interpret data and to question it. Find ways to test if the results are real or if you are making a mistake. Redefine a hypothesis, and how to make educated guesses. These basic skills do not require a student to develop new theories or methods, as is expected of Ph.D. students. I have involved many undergraduate and graduate students in my research. Research projects develop problem-solving skills for the real world. In addition, I show students the interdisciplinary aspects that are present in life science, and how other areas such as material science rely on computational and statistical physics.

Supervised Independent Studies:

Undergraduate Mahnaz Asghaei, Berrie Goldman, Aaron Halverson, Chekuri Sahithi and Mychica Simmons

Graduate Ammar Durghalli

Past Supervised Student Research:

Undergraduate Laura Gomez, Jeremy Hules, Chad Yamasaki, Rolando Maldonado, Arnulfo Martinez, Jamie Osorio and Trang Tong

Graduate Non-Thesis projects: Vahan Minassian, Tirso Silva and Carlos Soria

Alicia Heckathorne (M.S. Degree in 2002. *Now is a professional Bowler*)
1. M.S. Thesis: *A New Approach to the Alpha Helix Coil Transition Using Network Rigidity*

Dang Huynh (M.S. Degree from Biology, 2002. *Continued on to Yale for a Ph.D.*)
2. M.S. Thesis: *Comparison of Conformational Flexibility in Proteins Exhibiting Hinge-Bending Motions*

Jeremy Hules (M.S. Physics degree 2005. *LA Unified certified school teacher for grades 7-12*)
3. M.S. Thesis: *Quantitative Flexibility and Stability Relationships Within the Protein Thioredoxin*

Dundar Karabay (M.S. Physics degree, 2005. *Continued on to Univ. Cal. Riverside for a Ph.D.*)
4. M.S. Thesis: *Calculating Thermodynamic Properties of Protein Backbone Hydrogen Bonds Predicted by a Quantum Mechanical Model*

Moon Lee (M.S. Physics degree, 2005. *Continuing on into chemistry MS program*)
5. M.S. Thesis: *Investigations on thermodynamic characteristics of helix-coil transition in HP-heterogeneous polypeptides using network rigidity*

Current Supervised Student Research:

Shelley Green (Continuing Masters Degree at CSUN, target date of thesis defense, Spring 2006)
6. M.S. Thesis: *Investigating Protein Flexibility using Normal Modes from a Long-range DCM Elastic Network*

Biomedical Physics Courses Developed: (at California State University, Northridge for BA in Biomedical Physics)

1. BMPH 304 Physics of the Body (Junior level)
2. BMPH 360 Measurements in Biomedical Physics (Junior level: participated in overall advisement)
3. BMPH 405 Biomedical Physics I (Senior level)
4. BMPH 406 Biomedical Physics II (Senior level)
5. PHYS 595MB Molecular Biophysics (dual Senior and Graduate levels)

COURSES TAUGHT (since 8/1999, # indicates new courses that I developed)

1. PHYS 100A Freshmen Algebra-based Introductory Course (Mechanics, Sound, Thermodynamics)
2. PHYS 100AL Corresponding Lab to PHYS 100A
3. PHYS 100B Freshmen Algebra-based Introductory Course (Electromagnetism, Electricity, Optics, Modern)
4. PHYS 220A Freshmen Calculus-based Introductory Course (Mechanics)
5. #BMPH 304 Junior-level: Transition course covering physical modeling as applied to Physics of the Body.
6. PHYS 389 Junior-level: Core Course: Applied Mathematics course for Physicists
7. PHYS 405 Former BMPH 405, Final Course: Special topics course pertaining to Biological Physics.
8. #BMPH 405 Senior-level: Core course: Part I on Biophysics, Thermodynamic principles and applications
9. #BMPH 406 Senior-level: Core course: Part II on Biophysics, Statistical Mechanics, with more applications
10. PHYS 431 Senior-level: Core course in Thermal and Statistical Physics
11. PHYS 496 Senior-level: Advanced Research Computational Lab
12. PHYS 3121 Senior-level: Classical Mechanics
13. PHYS 630 Graduate-level: Core Course in Statistical Physics
14. PHYS 650 Graduate-level: Core Course in Quantum Mechanics

STUDENT PRESENTATIONS (since 8/1999, STUDENT PRESENTER UNDERLINED)

1. Fall 2000 Talk: Jeremy Hules, Undergraduate, 5th Annual Student Research Symposium
   Title: *Characterizing Flexibility in Proteins*

2. Fall 2001 Talk: **(1st place award)** Dang Huynh, Graduate, 6th Annual Student Research Symposium
   Title: *Comparison of Conformational Flexibility of Four Homologous Periplasmic Binding Proteins*

3. Nov 2001 Poster: D. Huynh, J. Osorio, L. Gomez, A. Martinez, 6th Annual Student Research Symposium
   Title: *Comparison of Conformational Flexibility of Four Homologous Periplasmic Binding Proteins*

4. April 2002 Talk: Alicia Heckathorne, Graduate, 2002 Sigma Xi Student Research Symposium
   Title: *Understanding the Alpha Helix Coil Transition Using Network Rigidity*

5. April 2002 Talk: **(1st place award)** Dang Huynh, Graduate, 2002 Sigma Xi Student Research Symposium
   Title: *Comparison of Conformational Flexibility of Four Homologous Periplasmic Binding Proteins*

6. April 2002 Talk: Dang Huynh, Graduate, 2002 Statewide CSU Student Research Symposium
   Title: *Comparison of Conformational Flexibility of Four Homologous Periplasmic Binding Proteins*

7. April 2004 Talk: Dundar Karabay, Graduate, 2004 Sigma Xi Student Research Symposium
   Title: *Hydrogen Bond Thermodynamic Properties* from a *Simple Quantum Mechanical Model*

8. Nov 2004 Talk: Dundar Karabay, Graduate, 9th Annual Student Research Symposium
   Title: Calculating Thermodynamic Properties of Protein Backbone Hydrogen Bonds Predicted by a Quantum Mechanical Model

9. Nov 2004 Talk: Moon S. Lee, Graduate, 9th Annual Student Research Symposium
   Title: *Identifying Thermodynamic Stability Characteristics in Heterogeneous Polypeptides Using a Minimal HP-model that Undergo the Alpha-Helix to Coil Transition*

10. Jan 2005 Poster: Moon Lee, G. Wood, D. Jacobs, 17th Annual CSU Biotechnology Symposium
    Title: *Identifying Thermodynamic Stability Characteristics in Heterogeneous Polypeptides that Undergo the Alpha-Helix to Coil Transition*

11. Jan 2005 Poster: Jeremy Hules, D. Livesay, D. Jacobs, 17th Annual CSU Biotechnology Symposium
    Title: Quantitative Stability and Flexibility Relationships within Thioredoxin

12. Jan 2005 Poster: Dundar Karabay, S. Dallakyan and D. Jacobs, 17th Annual CSU Biotechnology Symposium
    Title: *Calculating Thermodynamic Properties of Protein Backbone Hydrogen Bonds Predicted by a Quantum Mechanical Model*

13 April 2005 Talk: Dundar Karabay, Graduate, 2005 Sigma Xi Student Research Symposium
   Title: *Empirical Model for Molecular Atomic Partial Charges*

13 April 2005 Talk: Moon Suk Lee, Graduate, 2005 Sigma Xi Student Research Symposium
Title: *Thermodynamic Stability of Alpha-helix to Coil Transition in HP-polypeptides*

13 April 2005 Talk: (**3rd place award**) Jeremy Hules, Graduate, 2005 Sigma Xi Student Research Symposium
Title: *Quantitative Stability and Flexibility Relationships within the Protein Thioredoxin*

13 April 2005 Talk: Shelley Green, Graduate, 2005 Sigma Xi Student Research Symposium
Title: *Quantifying Stability-Flexibility Relationships in Proteins: Web Interface*