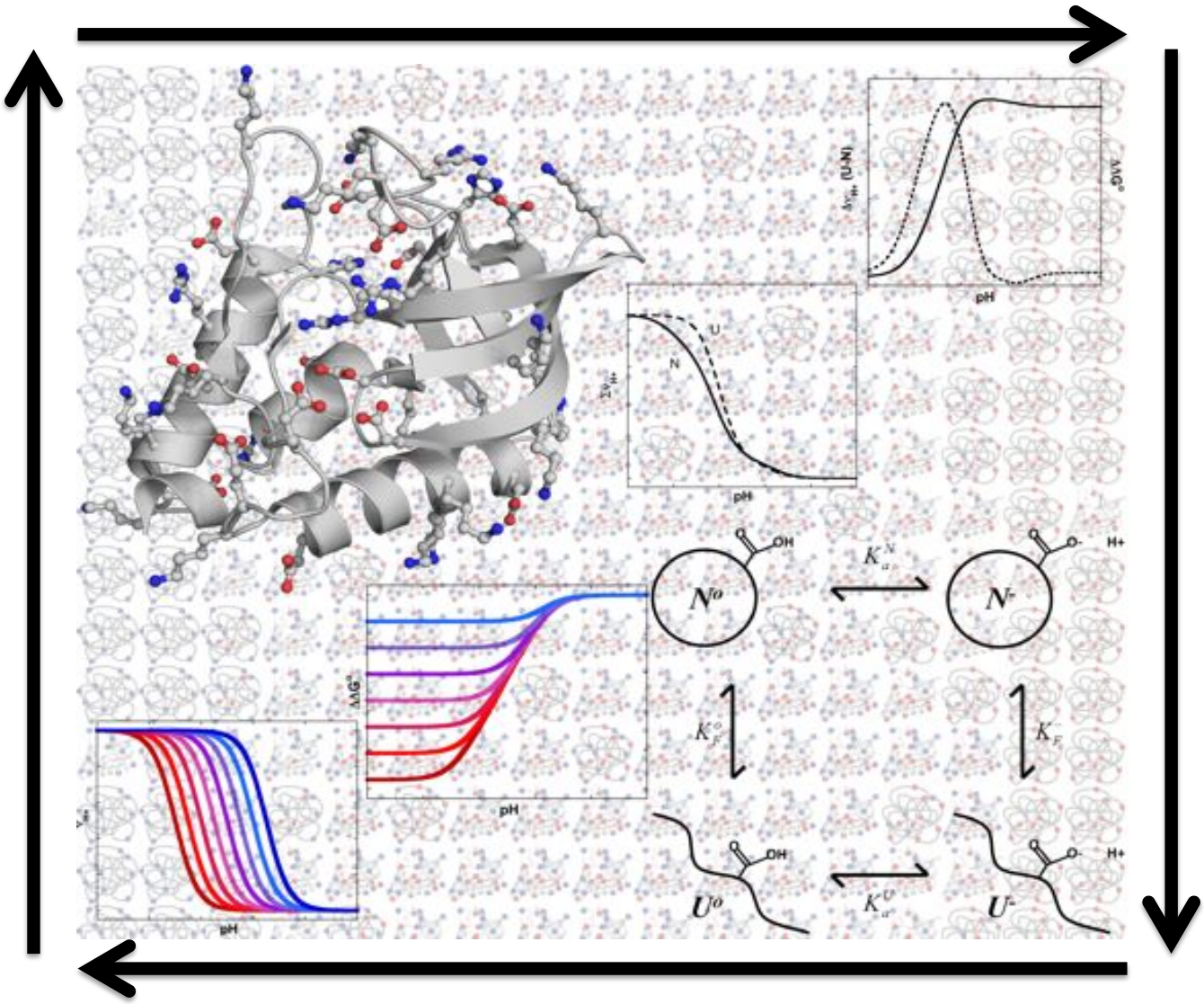
ΔG$_{ibbs_{25}}$

25th Annual Gibbs Conference on Biothermodynamics
Touch of Nature Environmental Center • Carbondale • Illinois
September 17-20, 2011



Organized by the Board of Directors
Gibbs Society of Biological Thermodynamics
Sponsored by Avanti Polar Lipids, Aviv Family Foundation, Beckman Coulter, GE Healthcare/Microcal, Horiba Scientific, ISS, Jasco, Micromath, OLIS, and UMMC

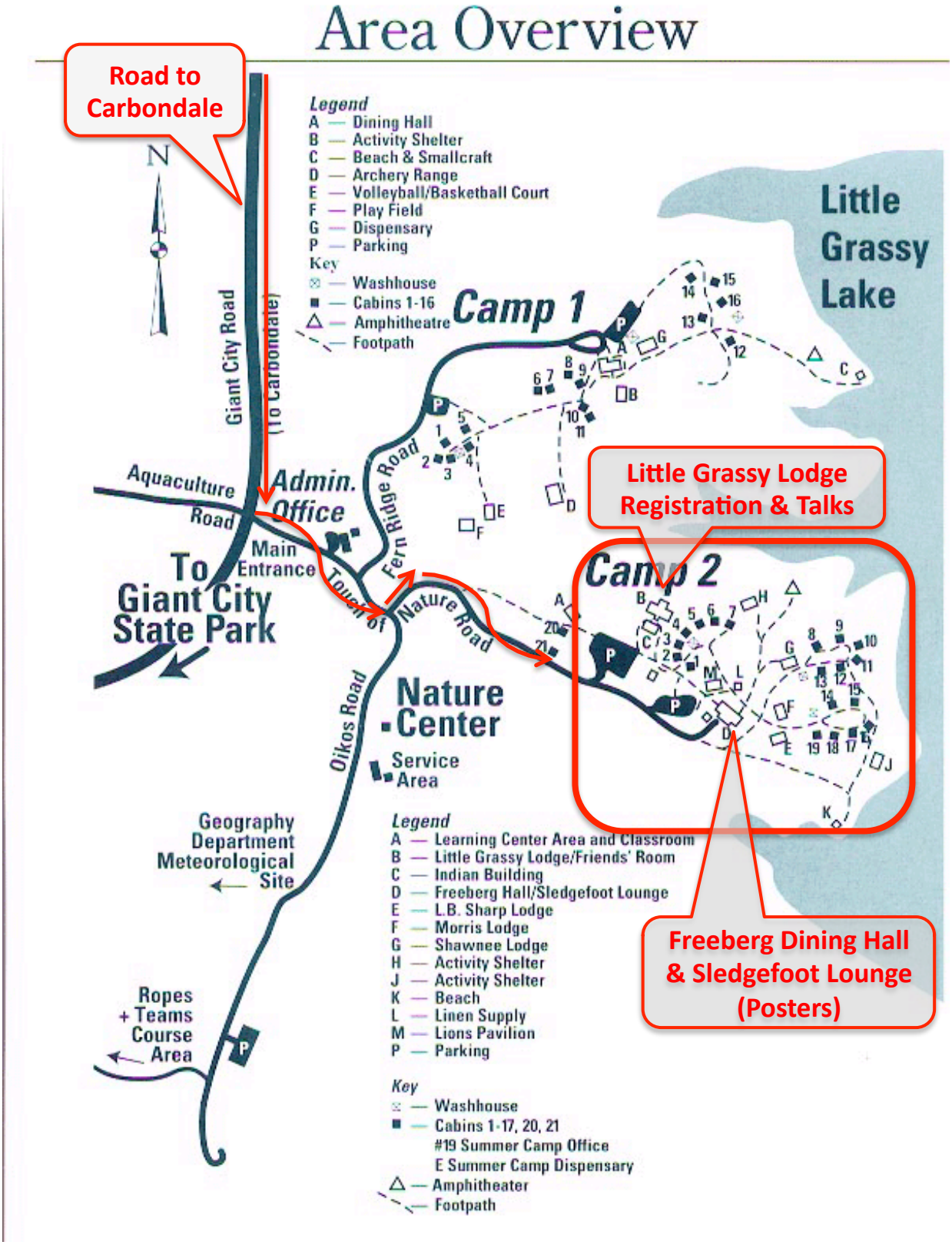
Table of Contents

The 25th Gibbs Conference on Biothermodynamics

Cover figure provided by Bertrand Garcia-Moreno E., Gibbs25 Keynote Speaker

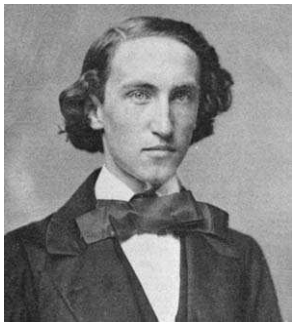
Map of Touch of Nature Environmental Center

Most of the Gibbs Conference activities will be held in "Camp 2" as shown in the map below. Cell phone reception is extremely limited; parking lots are popular places for making calls.



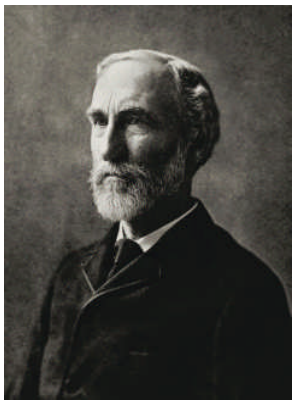
The Gibbs Conference on Biothermodynamics

History



Fall, 1986
Discussion of the discipline: Thermodynamics in Biological Systems
At the Gill residence in Vail, Colorado
Gary Ackers, Wayne Bolen, Ernesto Freire, Stan Gill, Jim Lee

February, 1987
Discussion of the discipline: Thermodynamics in Biological Systems
The Gumbo Shop, New Orleans, LA during the 31st annual Biophysical Society Meeting - Gary Ackers, Norma Allewell, Wayne Bolen, Ken Breslauer, Ken Dill, Ernesto Freire, Stan Gill, Jim Lee



A history of the first ten years of the meeting was provided by
Ackers GK, and Bolen DW The Gibbs Conference on Biothermodynamics: Origins and Evolution. *Biophysical Chemistry* **64** (1997) 3-5 (doi:10.1016/S0301-4622(96)02246-6)

An update is provided by Shea, MA, Correia, JJ, and Brenowitz, MD Introduction: Twenty five years of the Gibbs Conference on Biothermodynamics *Biophysical Chemistry* **159** (2011) 1-5 (doi:10.1016/j.bpc.2011.07.002)

A complete list of scientific contributions by past organizers to a special issue of *Biophysical Chemistry* commemorating the 25th Gibbs Conference follows the list of meetings.

Meetings

All meetings have been held at the Touch of Nature Environmental Center associated with Southern Illinois University – Carbondale. From 1987 through 1993, all of the speakers in the scientific sessions were students or postdoctoral fellows.

1987	Organizers: Jim Lee and Wayne Bolen Philosophical Talks: Gary K. Ackers and Ken Dill
1988	Organizers: Gary Ackers and Michael Johnson
1989	Organizers: Susan G. Frasier and Michael Johnson
1990	Organizers: Michael Johnson and Marty Straume
1991	Organizers: Gary Ackers and Tim Lohman. Keynote Speaker: Ernesto Freire
1992	Organizers: Jim Lee and Tomasz Heyduk. Keynote Speakers: Serge Timasheff and John Schellman
1993	Organizers: Maurice Eftink and Glen Ramsay. Keynote Speakers: Peter von Hippel and Julian Sturtevant
1994	Organizers: Enrico Di Cera and Madeline Shea. Keynote Speakers: Gary Ackers and Kathleen S. Matthews
1995	Organizers: Kenneth P. Murphy and Michael D. Brenowitz. Keynote Speakers: Victor Bloomfield and Mario Amzel

1996 Organizers: Jonathan B. Chaires and Michael L. Doyle
Keynote Speakers: J. Michael Schurr and Allen Minton

1997 Organizers: Dorothy Beckett and Jack Correia.
Keynote Speaker: Adrian Parsegian

1998 Organizer: Andy Robertson.
Keynote Speaker: David Draper

1999 Organizers: Bertrand Garcia-Moreno and John Shriver.
Keynote Speakers: Wayne Bolen and Gary Ackers

2000 Organizers: George Turner and Kim Sharp
Keynote Speaker: Steve White

2001 Organizers: Margaret A. Daugherty and Luis A. Marky
Keynote Speaker: George Rose

2002 Organizers: Michael Mossing and George Makhatadze
Keynote Speaker: Rodney Biltonen

2003 Organizers: Vince Hilser and Dick Sheardy.
Keynote Speaker: Jim Lee

2004 Organizers: Doug Barrick and Kathleen Hall.
Keynote Speaker: Nacho Tinoco

2005 Organizers: Trevor Creamer and Clay Clark.
Keynote Speaker: Carl Frieden

2006 Organizers: Karen Fleming and Rohit Pappu.
Keynote Speakers: Madeline A. Shea and Timothy Lohman

2007 Organizers: Brian M. Baker and Michael T. Henzl
Keynote Speaker: Jamie Williamson

2008 Organizers: Jannette Carey and David Bain.
Keynote Speakers: Dorothy Beckett and Ken Dill

2009 Organizers: Nathan Baker and Liskin Swint-Kruse
Keynote Speaker: Linda Jen-Jacobson
The Gary K. Ackers Lecture in Biothermodynamics: Michael Brenowitz

2010 Organizers: Elisar Barbar and Vince LiCata
Keynote Speaker: C. Nick Pace,
The Gary K. Ackers Lecture in Biothermodynamics: Timothy Lohman

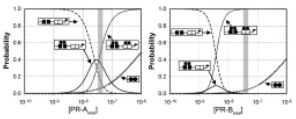
2011 Organizers: Gibbs Society of Board of Directors
Keynote Speaker: Bertrand Garcia-Moreno E.
The Gary K. Ackers Lecture in Biothermodynamics: Madeline Shea
Saturday Night Thermo Organizers – Liskin Swint-Kruse and Vincent J. LiCata
Editors of Special Issue of *Biophysical Chemistry* – Enrico Di Cera, Tim Lohman, Jack Correia

ΔGibbs$_{25}$ Special Issue of *Biophysical Chemistry*

Edited by Enrico Di Cera, Jack Correia and Tim Lohman

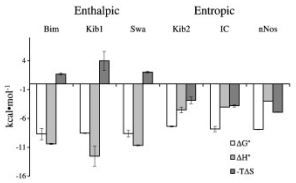
http://www.sciencedirect.com/science/journal/03014622

Scientific Contributions



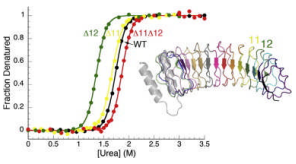
Bain

From Steroid Receptors to Cytokines:
The Thermodynamics of Self-Associating Systems
Keith D Connaghan, Ph.D., Amie D Moody, BA, James P Robblee, Ph.D., James R Lambert, Ph.D., David L Bain, Ph.D.



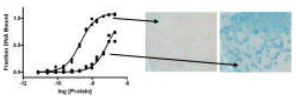
Barbar

Conformational Dynamics Promote Binding Diversity of Dynein Light Chain LC8
Afua Nyarko Justin Hall, Andrea Hall, Michael Hare, Elisar Barbar, Ph.D.



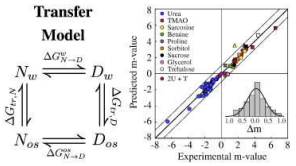
Barrick

Deletion of internal structured repeats increases the stability
of a leucine-rich repeat protein, YopM
Ellen F Vieux, Ph.D., Doug Barrick, Ph.D.



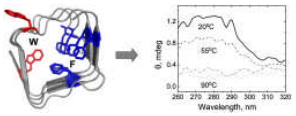
Beckett, Swint-Kruse

In vivo tests of thermodynamic models of transcription repressor function
Sudheer Tungtur, Harlyn Skinner, Hongli Zhan, Ph.D., Liskin Swint-Kruse, Ph.D., Dorothy Beckett, Ph.D.



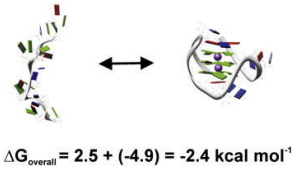
Bolen

Osmolyte effects on protein stability and solubility:
a balancing act between backbone and sidechains
Matthew Auton, Ph.D., Jörg Rösgen, Ph.D., Mikhail Sinev, Luis Marcelo F Holthauzen, David W Bolen, Ph.D.



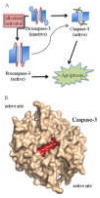
Brenowitz

Stability, denaturation and refolding of Mycobacterium tuberculosis MfpA,
a DNA mimicking protein that confers antibiotic resistance
Sergei Khrapunov, Ph.D, Michael Brenowitz, Ph.D



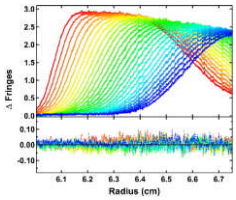
Chaires

Linkage of cation binding and folding in human telomeric quadruplex DNA
Robert D Gray, Ph.D., Jonathan B. Chaires, Ph.D.



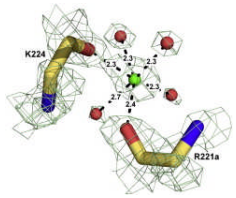
Clark

A bifunctional allosteric site in the dimer interface of procaspase-3
Joshua L Schipper, Sarah H MacKenzie, Ph.D., Anil Sharma, Ph.D., Clay Clark, Ph.D.



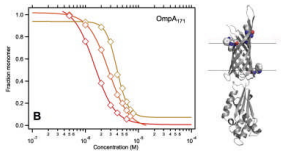
Correia

The use of analytical sedimentation velocity to extract thermodynamic linkage
James L Cole, Ph.D., John J Correia, Ph.D., Walter F Stafford, Ph.D.



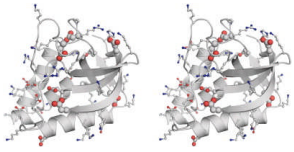
Di Cera

Rigidification of the autolysis loop enhances Na^+ binding to thrombin
Nicola Pozzi Raymond Chen, Zhiwei Chen, Alaji Bah, Enrico Di Cera



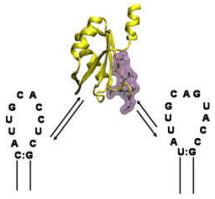
Fleming

The soluble, periplasmic domain of OmpA folds as an independent unit and displays chaperone activity by reducing the self-association propensity of the unfolded OmpA transmembrane β-barrel
Emily J Danoff, BS, Karen G Fleming, Ph.D.



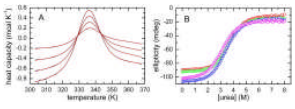
García-Moreno E.

Thermodynamic principles for the engineering of pH-driven conformational switches and acid insensitive proteins
Peregrine Bell-Upp, Aaron C Robinson, Steven Whitten, Erika L Wheeler, Janine Lin, Wesley E. Stites, Bertrand García-Moreno E



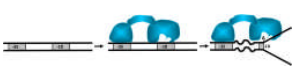
Hall

Human U2B" Protein Binding to snRNA Stemloops
Sandra G Williams, Kathleen B Hall



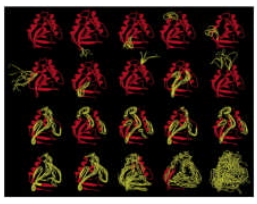
Henzl

Heightened Stability of Polcalcin Phl p 7 Is Correlated with Strategic Placement of Apolar Residues
Michael T Henzl, Ph.D., Mark A Reed, Anmin Tan, Ph.D.



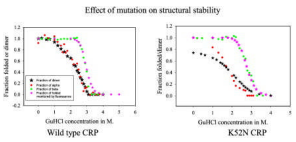
Heyduk

Promoter spacer DNA plays an active role in integrating the functional consequences of RNA polymerase contacts with -10 and -35 promoter elements
Malgorzata Sztiller-Sikorska, Ewa Heyduk, Tomasz Heyduk



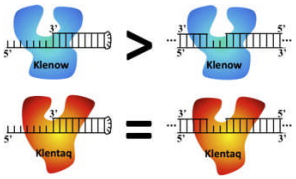
Hilser

The Role of Protein Conformational Fluctuations in Allostery, Function, and Evolution
James O Wrabl, Ph.D., Jenny Gu, Ph.D., Tong Liu, Ph.D., Travis P Schrank, Ph.D., Steven T Whitten, Ph.D., Vincent J Hilser, Ph.D.



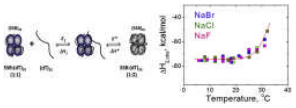
Lee

Modulation of Allosteric Behavior Through Adjustment of the Differential Stability of the Two Interacting Domains in E. coli cAMP Receptor Protein
Jianquan Li, Ph.D. and James Ching Lee, Ph.D.



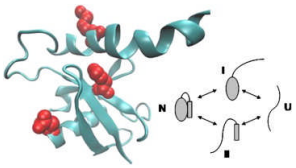
LiCata

Interactions of replication versus repair DNA substrates with the Pol I DNA polymerases from E. coli and T. aquaticus
Yanling Yang, Vince J LiCata



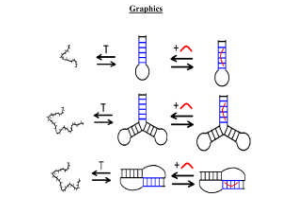
Lohman

E. coli SSB tetramer binds the first and second molecules of $(dT)_{35}$ with heat capacities of opposite sign
Alexander G Kozlov, Timothy Lohman



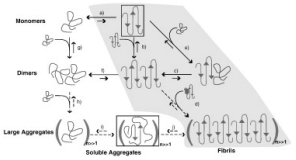
Makhatadze

Equilibrium and Kinetic Studies of Protein Cooperativity using Urea-Induced Folding/Unfolding of a Ubq-UIM Fusion Protein
Mayank M Patel, Franco Tzul, George Makhatadze



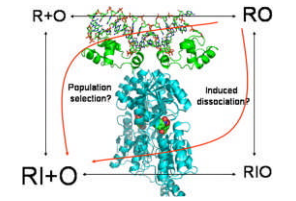
Marky

Melting Behvior and Ligand Binding of DNA Intramolecular Secondary Structures
Souvik Maiti Ph.D., Besik Kankia, Ph.D., Irine Khutsishvili, Ph.D., Luis A Marky, Ph.D.



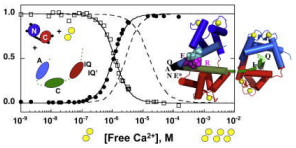
Pappu

Assessing the contribution of heterogeneous distributions of oligomers to aggregation mechanisms for polyglutamine peptides
Andreas Vitalis, Ph.D., Rohit V Pappu, Ph.D.



Sharp

Allostery in the Lac Operon: Population Selection or Induced Dissociation?
Kim A Sharp, Ph.D



Shea

Thermodynamic Linkage Between Calmodulin Domains Binding Calcium and Contiguous Sites in the C-Terminal Tail of $Ca_V1.2$
T. Idil Apak Evans, Ph.D., Johannes W Hell, Ph.D., Madeline A Shea, Ph.D.

Gibbs Society Governance

Incorporation

In 2002, the *Gibbs Society on Biological Thermodynamics* incorporated in the Commonwealth of Virginia, under the guidance of Michael L. Johnson, then Treasurer of the Society and originator of the Society website. Articles of Incorporation and By Laws are available here: http://www.jhu.edu/~gibbs.

Current Officers

- President: Karen G. Fleming, 2010-2011
- Vice President: Michael L. Johnson, 2011 - 2013
- Secretary: Margaret A. Daugherty, 2004 – 2013
- Treasurer: John J. Correia, March 2011 – October, 2016

Board of Directors, listed alphabetically

- Karen Fleming, President
- Douglas Barrick, President Elect
- Bertrand Garcia-Moreno, Past President
- Michael L. Johnson, Vice President
- John J. Correia, Treasurer
- Margaret Daugherty, Secretary
- Madeline Shea

Past Presidents

2001-2002	Gary Ackers
2002-2003	Jack Correia
2003-2004	D. Wayne Bolen
2004-2005	Madeline Shea
2005-2006	Dorothy Beckett
2006-2007	Jonathan (Brad) Chaires
2007-2008	Tim Lohman
2008-2009	Luis Marky
2009-2010	Bertrand Garcia-Moreno E.

Past Treasurer

2001-2011	Michael L. Johnson

Committees & Other Contributions

Ackers Lecturer Selection Committee – James Ching Lee, Chair
Gibbs Society Website Hosting – Karen Fleming (2010 -)

GoogleDocs Application/Registration & PayPal – Nathan Baker and Jack Correia
Mailing List – Madeline Shea
Fundraising – Madeline Shea and Jack Correia
Gibbs25 Website Hosting – Karen Fleming
Catering, Wine and Meal Contract – Jack Correia and Liskin Swint-Kruse
With thanks to Alan Teska and Mike Scott at the Touch of Nature Conference Center!

3rd Annual Gary K. Ackers Lecture in Biological Thermodynamics

2011 Lecturer – Madeline A. Shea, Carver College of Medicine, University of Iowa

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This lecture honors the scientific contributions of Gary K. Ackers (1939-2011) to the field of Biological Thermodynamics. He served on the faculty of the University of Virginia, and the Johns Hopkins University and the Washington University School of Medicine. He was a Fellow of the Biophysical Society, and was one of the founding organizers of the Gibbs Conference.

Gary demonstrated a lifelong commitment to the growth and development of an intellectual community of scholars devoted to furthering the field of biothermodynamics. Gary was an active member of the Biophysical Society throughout his career and served as President of the Society, as well as Organizer of the annual meeting. While on the faculty of the University of Virginia, he was a leader in the graduate biophysics training program. When on the faculty in the Department of Biology at the Johns Hopkins University, he conceived and organized the *Institute for Biophysical Studies of Macromolecular Assemblies*, a university-wide training program in molecular biophysics that has continued for decades. While at Johns Hopkins, he also played a leading role in the establishment of the Gibbs Conference on Biothermodynamics, an annual meeting organized to promote innovative development of biophysical principles applied to current problems in biology and to train the next generation of molecular biophysicists to tackle hard problems rigorously. After moving to St. Louis to chair the Department of Biochemistry and Molecular Biophysics at Washington University, he spearheaded a new graduate program in biophysics and hired many faculty who have joined the community of regular contributors to the Gibbs Conference.

Gary was a pioneer in the development of methods and application of principles of equilibrium thermodynamics to the study of linkage in complex macromolecular assemblies. Studies from his laboratory on the energetics of self-association and ligand binding in human hemoglobin proved unequivocally that the classic and elegant MWC model of intersubunit allostery was insufficient to explain cooperative oxygen binding: the position, as well as the number, of ligands matters. His contributions in this area greatly enhanced our understanding of the relationship between structure, energy and function in hemoglobin, and in multimeric allosteric systems in general. By probing ever more deeply into the molecular mechanism of cooperativity, he demonstrated a beautiful, useful, and general strategy for dissecting functional energetics in macromolecular assemblies.

His quantitative study of the interactions between proteins and nucleic acids in the bacteriophage lambda system included the development of quantitative DNase footprinting methods for measuring free energies of repressor-operator interactions. The footprinting assay remains an effective tool for measuring the extremely tight binding constants that are often encountered in site-specific interactions between proteins and nucleic acids. Those studies paved the way for similar methods to study protein-nucleic acid interactions in more complex systems, including time-resolved studies of the kinetics of RNA folding. Based on his experimental studies of phage lambda, his group developed statistical thermodynamic models to simulate the lysogenic-to-lytic growth switch: the series of macromolecular events that determine the fate of bacteriophage lambda during infection of E. Coli. This work demonstrated how a complex biological function could be predicted quantitatively, strictly from the kinetics of transcription and translation, and the Gibbs free energy of interactions between the key macromolecular components in the genetic switch.

During Gary's early career, he developed methods to measure association constants in self-associating systems based on analytical gel permeation chromatography. Those methods have since become standard tools in the field. His group was also responsible for modifications of the cryo-gel electrophoresis methods, moving from applying them to hemoglobin to protein-DNA interactions. These contributions focused on developing the capacity to quantify intermediate states that are only transiently populated during the course of a biochemical process. His more than 200 articles and chapters changed our view of the molecular mechanisms that govern complex biochemical reactions.

$\Delta Gibbs_{25}$ • Saturday Evening • September 17, 2011

4:00 – 10:00 pm **Check-in at Little Grassy Lodge**

7:30 –10:00 pm **Open Reception in Indian Lodge - Light refreshments, beer, wine and soft drinks.**
Participants are expected to make dinner arrangements independently.
Gibbs T-shirt Bazaar – please pay for the shirts ordered during registration.

Posters to be presented on Sunday night may be mounted any time prior to 8 pm Sunday.

Saturday Night Thermo – Events For Trainees Only

Faculty Organizers
Vince LiCata, Louisiana State University & Liskin Swint-Kruse, Kansas University Medical Center
Trainee Moderators
Sarah MacKenzie, Laboratory of Clay Clark, NCSU
Andy Wowor, Laboratory of Jim Cole, U. Conn.

5:30 pm **Freeberg Hall - Dinner for trainees who registered in advance**

6:00 pm **Flash Talks (Poster Introductions) – session open to all trainees**

1. **Hao Ching Hsiao, Bondos Laboratory, Texas A&M Health Science Center**
   Ultrabithorax, An Intrinsically Disordered Protein, Selects Protein Interactions by Topology
2. **Je Ko, Heyduk Laboratory, St. Louis University**
   Determinants of the rate of promoter escape by bacterial RNA polymerase
3. **Jaycob Warfel, LiCata Laboratory, Louisiana State University**
   Thermodynamic Studies of Deinococcus radiodurans Type I DNA polymeraseThermodynamic Studies of Deinococcus radiodurans Type I DNA polymerase
4. **Hesam N. Motlagh, Hilser Laboratory, John Hopkins University**
   How can a ligand be an agonist and antagonist for the same protein?
5. **Anne Rice, Hinderliter Laboratory, University of Minnesota - Duluth**
   A Modeling System for the Deconvolution of the Coupling Energy of Synaptotagmin C2AB Domains using DSC
6. **Lei Wang, Mossing Laboratory, University of Mississippi**
   Cro Variants to Distinguish Kinetic and Equilibrium Control of Gene Circuits
7. **James Campell, Whitten Laboratory, Texas State University – San Marcos**
   Correlation of m-value effects to cold-resistant substructures of the protein ensemble.
8. **Megan Murtaugh, Horn Laboratory, Northern Illinois University**
   Characterization of an engineered pH-dependent single domain (VHH) antibody to explore the role of individual histidines in the observed pH sensitivity

7:00 - 7:15 pm **Refreshment Break**

7:15 pm **Career Panel – session open to all trainees**
Margaret Daugherty, Colorado College, Colorado Springs, CO
Michael Doyle, Bristol-Myers-Squibb, New Jersey
Glen Ramsay, Aviv Biomedical, Inc., Lakewood, NJ

8:15 pm **Adjourn to Reception in Indian Lodge**

$\Delta Gibbs_{25}$ • Sunday Morning • September 18, 2011

7:00 - 8:15 am Breakfast served in Freeberg Hall

Structural Origins of Thermodynamic Potentials

8:30 am **Welcome by Karen Fleming, Gibbs Society President**

***Moderator*:** **John Froehlig, Wade Laboratory, John Hopkins University**

8:35 am **Introduction to the 25th Annual Gibbs Conference Keynote Speaker**
D. Wayne Bolen, University of Texas Medical Branch
Founding Co-Organizer of the 1987 Conference

8:50 am **Keynote Lecture**
Bertrand Garcia-Moreno E.
Johns Hopkins University School of Arts and Sciences
Protein electrostatics: have we made progress in 25 years?

9:30 – 9:45 am **Andrew Hagarman, Oas Laboratory, Duke University**
Thermodynamic investigation of protein A andtibody binding domain folding

9:45 – 10:00 am **Emma Morrison, Henzler-Wildman Laboratory, Washington University**
A Protein Dynamics Investigation into Broad Ligand Specificity in the Multi-Drug Resistance Transporter, EmrE.

10:00 – 10:20 am **Break – Refreshments in Indian Lodge**

10:20 – 10:50 am **Vince Hilser, Johns Hopkins University, School of Arts and Sciences**
Allostery in an Ensemble

10:50 – 11:15 am **Rodrigo Maillard, Bustamante Laboratory, University of California - Berkeley**
Force-Induced Mechanical Unfolding of Protein Substrates by the AAA+ Protease ClpXP

11:15 – 11:45 **Mario Amzel, Johns Hopkins University School of Medicine**
Computation of free energies by Multi-Step Trajectory Combinations

Panel Leader: **Nathan Baker, Pacific Northwest National Laboratory**

11:45 – 12:00 **Panel Discussion by All Speakers**

12:05 pm **Conference photo near Freeberg Hall**

12:15 pm **Lunch in Freeberg Hall**

Free Time until Late Afternoon Session.
Information about local parks & attractions is available near the entrance to Little Grassy Lodge.

$\Delta Gibbs_{25}$ • Sunday Afternoon • September 18, 2011

Solvent and Solute Interactions with Macromolecules

Moderator: **Ann Murray, Fuentes Laboratory, University of Iowa Carver College of Medicine**

3:00 – 3:15 **Luis Marky, University of Nebraska Medical Center**
Introduction to the Field

3:15 – 3:45 pm **David Draper, Johns Hopkins University School of Arts and Sciences**
Thermodynamic "crosstalk" in the conversation between RNAs, ions, and osmolytes

3:45 – 4:00 pm **Esther Braselmann, Clark Laboratory, University of Notre Dame**
Investigating the conformation of an autotransporter protein in the bacterial periplasm

4:00 – 4:30 pm **D. Wayne Bolen, University of Texas Medical Branch**
Osmolyte effects on protein stability and solubility:
a balancing act between backbone and side-chains

4:30 – 4:45 pm **Break – Refreshments in Indian Lodge**

4:45 – 5:00 pm **Joseph Kasper, Park Laboratory, Purdue University**
Transient partial unfolding in E. coli DHFR

5:00 – 5:15 pm **Ronald Toth, Laue Laboratory, University of New Hampshire**
Nonideality in High Concentration Solutions

5:30 – 5:45 pm **Karen Fleming, Johns Hopkins University School of Arts and Sciences**
Membrane protein stability

Panel Leader: **Vince LiCata, Louisiana State University**

5:45 – 6 pm **Panel Discussion by All Speakers**

6:15 **Dinner in Freeberg Hall**

$\Delta Gibbs_{25}$ • Sunday Evening • September 18, 2011

8 – 10 pm **Poster Session I in Sledgefoot (lower level) & Freeberg (upper level)**
Presenters with last names from A to L
Please remove posters before midnight to make room for Monday presenters.

Sponsors Displays in Freeberg (upper level) - near Beer, Wine and Soda

$\Delta Gibbs_{25}$ • Monday Morning • September 19, 2011

Posters to be presented on Monday night may be mounted as soon as space is available on Sunday night.

Airport Ride Board will be available in Little Grassy Lodge, near check-in window

7:00 – 8:15 am **Breakfast in Freeberg Hall**

Cooperativity, Allostery and Ensembles of Macromolecular States

8:30 am **Announcements by Organizers**

Moderator: **Dan Parente, Swint-Kruse Laboratory, KUMC University**

8:35 **Introduction to the Gary K. Ackers Lecture in Biothermodynamics**
James Ching Lee, University of Texas Medical Branch
Founding Co-Organizer of the 1987 Conference

8:50 – 9:30 am **3rd Annual Gary K. Ackers Lecture in Biothermodynamics**
Madeline A. Shea, Carver College of Medicine, University of Iowa
Calcium-Triggered EF-Hands Grasp and Remodel Ion Channels

9:30 – 9:45 am **Brian Doctrow, Garcia-Moreno Laboratory, John Hopkins University**
Cooperativity in a cluster of carboxylic groups in the active site of a protein

9:45 – 10:00 am **Nicola Pozzi, Di Cera Laboratory, Saint Louis University**
Conformational Plasticity in Trypsin-like Zymogens: The case of Prethrombin-2

10:00 – 10:20 am **Break – Refreshments in Indian Lodge**

10:20 – 10:50 am **J. Brad Chaires, University of Louisville**
Folding and Energy Landscape of Telomeric G-quadruplex DNA

10:50 – 11:15 am **Katherine Launer-Felty, Cole Laboratory, University of Connecticut**
Inhibition of Protein Kinase R by Adenovirus virus-associated RNA I

11:15 – 11:45 **James Ching Lee, University of Texas Medical Branch**
Mechanisms in modulating allostery in E. coli cAMP receptor protein, CRP

Panel Leader: **Dorothy Beckett, University of Maryland College Park**

11:45 – 12:00 **Panel Discussion by All Speakers**

12:10 pm **Lunch in Freeberg Hall**

1 – 2 pm **Meeting of Past Organizers – Indian Building**
Refreshment area will be unavailable to other meeting attendees during this time.

Free Time until Late Afternoon Session.
Information about local parks & attractions is available near the entrance to Little Grassy Lodge.

Airport Ride Board will be available in Little Grassy Lodge, near the check-in window

$\Delta Gibbs_{25}$ • Monday Afternoon • September 19, 2011

Biothermodynamics and Disease: Free Energy in the Clinic

Moderator: **Mani Vunnam, Pedigo Laboratory, University of Mississippi**

3:00 – 3:15 pm **Jack Correia, University of Mississippi Medical Center**
Introduction to the Field

3:15 – 3:45 pm **David Bain, University of Colorado Health Sciences Center**
Toward a Quantitative Understanding of the Human Steroid Receptors:
The Role of Energetics

3:45 – 4:00 pm **Josh Schipper, Clark Laboratory, North Carolina State University**
Allosteric Activation of Procaspase-3 as a Novel Cancer Therapeutic

4:00 – 4:30 pm **Jim Cole, University of Connecticut**
Analysis of macromolecular interactions in drug discovery research

4:30 – 4:45 pm **Break – Refreshments in Indian Lodge**

4:45 – 5:00 pm **Daniel Lyons, Correia Laboratory, University Mississippi Medical Center**
Structural and Hydrodynamic Analysis of a
Novel Drug Delivery Vector: ELP[V5G3A2-150]

5:00 – 5:15 pm **William Hawse, Baker Laboratory, Notre Dame University**
Physical Basis of Antigen Recognition and Signaling by T Cell Receptors

5:15 – 5:45 pm **Enrico Di Cera, St. Louis University**
Allostery in trypsin-like proteases suggests new therapeutic strategies

Panel Leader: **A. Clay Clark, North Carolina State University**

5:45 – 6 pm **Panel Discussion by All Speakers**

6:15 pm **Dinner in Freeberg Hall**

$\Delta Gibbs_{25}$ • Monday Evening • September 19, 2011

8 – 10 pm **Poster Session I in Sledgefoot (lower level) & Freeberg (upper level)**
Poster Presenters with last name starting from M to Z
(please remove posters before midnight)

Sponsor Displays in Freeberg (upper level) near Beer, Wine and Soda

$\Delta Gibbs_{25}$ • Tuesday Morning • September 20, 2011

Checkout - please leave your room keys at the counter in the lobby of Little Grassy Lodge

Airport Ride Board will be available in Little Grassy Lodge, near the check-in window

7:30 – 8:30 am **Breakfast in Freeberg Hall**

Thermostability and its Pressure on Evolution of Macromolecules

8:40 am **Closing Announcements by Organizers**

Moderator: **Catherine Carney, Perez-Alvarado Laboratory, SIUC**

8:45 – 9:00 am **Patricia Clark, Notre Dame University**
Introduction to the Field

9:00 - 9:30 am **Doug Barrick, Johns Hopkins University School of Arts and Sciences**
Origins of Cooperativity in Protein Folding

9:30 – 9:45 am **Katie Hart, Marqusee Laboratory, University of California - Berkeley**
Evolution of the Energy Landscape: Using ancestral protein resurrection to investigate changes in RNase H over evolutionary time

9:45 – 10:00 am **Sean Fanning, Horn Laboratory, Northern Illinois University**
Structural and Biophysical Investigations of an Engineered Dual-Function Camelid Antibody Reveal the Mechanism of Metalloregulation

10:00 – 10:20 am **Break – Refreshments in Indian Lodge**

10:20 – 10:50 am **Kathleen Hall, Washington University**
Thermodynamics of U1A/U2B binding to RNA Stemloops

10:50 – 11:05 am **Michal Szymanski, Bujalowski Laboratory, University of Texas Medical Branch**
Initiation of Primosome Assembly

11:05 – 11:35 am **Terry Oas, Duke University**
The role of thermodynamic stability in Staphylococcal protein A function

Panel Leader: **Trevor Creamer, University of Kentucky**

11:35 – 11:50 am **Panel Discussion by All Speakers**

noon **Box lunch available in Freeberg Hall**

Checkout Please leave your room keys at the counter in Little Grassy Lodge

Posters

Poster Information

Posters will be presented in two evening sessions in Sledgefoot Hall (next to Freeburg Dining Hall). Session I will be held Sunday evening and will feature posters from presenters with last names A to L. Session II will be held Monday evening and will feature posters from presenters with last names M to Y. Both sessions will start at 8:00 pm; posters should be taken down before the talks start the next morning.

Session I

1. **Characterization of erp Operator DNA binding by Borrelia burgdorferi protein BpaB.** Claire A Adams, Manana Melikeshvili, Michael G Fried and Brian Stevenson, University of Kentucky

2. **Dithioated Phosphates in Protein-DNA Interactions**
   Anderson KM, Sur A, Volk DE, Gorenstein DG

3. **DNA binding properties of the single-strand DNA binding protein (SSB) from Plasmodium falciparum.** Edwin Antony, Alex Kozlov, Sergey Korolev and Timothy Lohman. Washington University School of Medicine

4. **Thermodynamic Principles for the Engineering of pH-driven Protein Conformational Changes.** Peregrine Bell-Upp, Aaron C. Robinson, Erika L. Wheeler, Bertrand García-Moreno E. Johns Hopkins University

5. **The N-terminus of the VirG autotransporter destabilizes the entire passenger in vitro: Implications for in vivo secretion.** Richard N. Besingi and Patricia L. Clark. University of Notre Dame

6. **Structural and Thermodynamic Signatures of DNA Recognition by Mycobacterium tuberculosis DnaA.** Tapan Biswas & Oleg Tsodikov, University of Michigan

7. **Construction and analysis of a stable single chain T cell receptor to study site specific flexibility and dynamics.** Sydney Blevins, Francis Insaidoo, and Brian Baker. University of Notre Dame

8. **Partitioning of DNA Between the Polymerization and Exonuclease Active Sites in Klenow DNA Polymerase.** Hiromi S. Brown and Vince J. LiCata. Louisiana State University

9. **Insight into the mechanism of action of osmolytes on protein stability and folding pathways using single molecule techniques.** Paul J. Bujalowski, Liang Ma, & Andres F. Oberhauser. UTMB

10. **Characterizing Allosteric Networks in Procaspase-3.** Christine Cade, Paul Swartz, Carla Mattos, A. Clay Clark. North Carolina State University

11. **Correlation of m-value effects to cold-resistant substructures of the protein ensemble.** James C. Campbell and Steven T. Whitten. Texas State University - San Marcos

12. **Studies on the metal-dependent catalytic activity of the HD phosphohydrolase domain in the conserved virulence factor A.** Catherine A. Carney*, Bryce C. Hilburn*, Rebecca C. Weber, Kyu Hong Cho, Brian M. Lee and Gabriela C. Pérez-Alvarado. Southern Illinois University

13. **Role of internal cavities as determinants of pressure unfolding of proteins.** Jose A. Caro, Julien Roche, Jean-Baptiste Rouget, Douglas Norberto, Jamie Schlessman, Catherine A. Royer, Christian Roumestand, Angel García and Bertrand García-Moreno. JHU

14. **K11-linked diubiquitin exhibits significant interdomain dynamics.** Carlos A. Castañeda, Tanuja Kashyap and David Fushman, University of Maryland

15. **Conservation of Rare Codon Clusters.** Julie Chaney, Rory Carmichael, Scott Emrich and Patricia L. Clark. University of Notre Dame

16. **Effect of Base Substitutions on the Conformation M. tuberculosis rRNA Hairpins** Bok-Eum Choi, Ying Li, and Ana-Maria Soto, Towson University

17. **Large conformational change upon DNA binding of the Drosophila Hox protein Ultrabithorax.** Kelly Churion,Ying Liu, Kathleen Matthews, and Sarah Bondos Texas A&M University Health Science Center

18. **Cooperativity Dictates Progesterone Receptor Mediated Recruitment of the Transcriptional Coactivator GRIP1.** Keith D. Connaghan, Michael T. Miura, & David L. Bain. University of Colorado Anschutz Medical Campus

19. **On the Stability and Conformation of RNA Hairpins Containing Bulges.** Gordon Crews and Ana-Maria Soto, Towson University

20. **Exploration of a maybe not so rugged RNA folding landscape.** Cassidy Crook, Joerg Schlatterer and Michael Brenowitz, Albert Einstein College of Medicine

21. **Linked Binding and Conformational Equilibria in Bacillus subtilis P Protein: Ligand Binding to the Intermediate and Folded States.** Kyle G. Daniels, Terrence G. Oas, Duke University

22. **The periplasmic domain of OmpA displays chaperone activity by reducing the self-association propensity of the unfolded OmpA transmembrane β-barrel.** Emily J. Danoff and Karen G. Fleming, Johns Hopkins University

23. **Pathway selection for folding of the leucine-rich repeat protein PP32.** Thuy Dao, Ananya Majumdar, Doug Barrick, Johns Hopkins University

24. **Basic regions of monomeric bZIP transcription factors have intrinsic helicities that impact their DNA binding specificity.** Rahul K. Das, Scott L. Crick, Ashok A. Deniz, and Rohit V. Pappu, Washington University

25. **Self-Association and Promoter Binding Energetics of the Androgen Receptor: Contribution to a Predictive Model of Steroid Receptor-Specific Function.** Rolando De Angelis, Michael T. Miura and David L. Bain, University of Colorado Anschutz Medical Campus

26. **Allosteric interaction of nucleotides and tRNAala with E. coli Alanyl-tRNA Synthetase** John David Dignam, Jingshu Guo, Wendell P. Griffith, Amanda Holloway and Timothy Mueser, University of Toledo College of Medicine

27. **The Glutamate Effect on the Functionality of Pol I DNA Polymerases** Mytrang H. Do and Vince J. LiCata, Louisiana State University

28. **Regulation of calcineurin is controlled by a disordered to ordered transition** Tori B. Dunlap, Julie Rumi-Masante, Terrence E. Lester, A. Keith Dunker, David D. Weis, Trevor P. Creamer, University of Kentucky

29. **Translocation Characteristics of RSC** Allen Eastlund, Shuja Malik, Chris Fischer, University of Kansas

30. **Coupling of Ligand-Induced Folding and Dynamics in an Allosteric Protein** Christopher Eginton, Colef Talbert, and Dorothy Beckett, University of Maryland Colleg Park

31. **Direct Calorimetric Determination of a Complete Polyproline II (PII) Propensity Scale Reveals PII Enhancement in Intrinsically Disordered Proteins.** W. Austin Elam, Travis P. Schrank, Vincent J. Hilser, Johns Hopkins University

32. **HISTIDINE-TAG-SPECIFIC OPTICAL PROBES FOR ANALYTICAL ULTRACENTRIFUGATION ANALYSIS.** Heather E. Elverson, Lance M. Hellman, Manana Melikishvili, Chunxia Zhao, Sidney W. Whiteheart and Michael G. Fried. The University of Kentucky

33. **Thermodynamic Elucidation of Cooperative Mechanisms Employed by Human Synaptotagmin I.** Michael E. Fealey, Sarah C. Kempka, Jacob W. Gauer, Ben J. Riley, Ryan W. Mahling, R. Bryan Sutton, and Anne Hinderliter, University of Minnesota Duluth

34. **Measuring Rapid Hydrogen Exchange in Large Proteins with NMR Spectroscopy** Nicholas C. Fitzkee, Dennis A. Torchia, and Ad Bax, Mississippi State University

35. **Structural and Functional Characterization of SAV2435, a Novel Multidrug Resistance Protein.** John R.C. Froehlig Jr., Sharrol Bachas, Drew Gunio, and Herschel Wade, Johns Hopkins University

36. **Impact of CD Loop and Dovetail Mutations on the Divalent Ion Affinity of Rat alpha-Parvalbumin.** Michael T. Henzl, Meredith E. Davis, and Lindsey A. Markus, University of Missouri

37. **The bacterial biofilm protein Aap forms zinc-dependent oligomers and amyloid fibers** Andrew B. Herr*, Deborah G. Conrady, and Stefanie L. Johns, University of Cincinnati College of Medicine

38. **Mechanisms of molecular recognition by the transcription factor LMO7.** Bryce C. Hilburn, Justin C. Baker, Jun Li, Mateo C. Houle, Janelle M. Owens, Shannon Banning, Fernando F. Cuadrado, Tori L. Nosovitsky and Gabriela C. Pérez-Alvarado, Southern Illinois University

39. **DIMERIC STATES OF NEURAL- AND EPITHELIAL-CADHERINS ARE DISTINGUISHED BY THE RATE OF DISASSEMBLY.** Xiaoyun Howard, Nagamani Vunnam and Susan Pedigo, University of Mississippi

40. **Ultrabithorax, An Intrinsically Disordered Protein, Selects Protein Interactions by Topology.** Hao-Ching Hsiao, Daniel J. Catanese, Jr.,Kim Gonzalez, Kathleen S. Matthews, and Sarah E. Bondos, Texas A&M University Health Science Center

41. **Analysis of protein kinase R binding to dsRNA using fluorescence-detected analytical ultracentrifugation.** Bushra Husain, Ishita Mukerji and James L. Cole, University of Connecticut

42. **Evaluating Physiological Complexity of Liposomes for Fusion Potential.** Heathere Jacobson, Ryan Sisk and Anne Hinderliter, University of Minnesota Duluth

43. **Cholesterol modulates binding of annexin a5 to calcium ion and acidic phospholipid containing membranes: a model for peripheral membrane binding proteins.** Samantha R. Jaworski, Jacob W. Gauer, and Anne Hinderliter, University of Minnesota Duluth

44. **Single-molecule analysis of protein folding on the ribosome** Christian Kaiser, University of California, Berkeley

45. **Mass Spectrometry Amino Acid Analysis of Monomer, Oligomer and Fibril Forms of Amyloid-beta Protein.** Alexandra Klinger and Paul Axelsen, **University of Pennsylvania**

46. **Determinants of the rate of promoter escape by bacterial RNA polymerase** Je Ko and Tomasz Heyduk, Saint Louis University

47. **E.coli SSB tetramer binds the first and second molecules of (dT)35 with heat capacities of opposite sign.** Alexander G. Kozlov, Timothy M. Lohman, Washington University in St. Louis

48. **Practical application of simple biophysics: target induced oligonucleotide affinity switching for detection of the antibodies.** Agnieszka Lass-Napiorkowska, Ewa Heyduk, Ling Tian and Tomasz Heyduk, St. Louis University.

49. **Nanocystals in Structural Biology.** Eaton Lattman, Hauptman-Woodward Institute

50. **The use of short partially complimentary sequences to model ds G-quadruplex DNA structure.** Vu H. Le, Edwin A. Lewis, Mississippi State University

51. **The role of Intrinsic Disorder in mediating Allostery: some insights from studying inter-domain coupling of Glucocorticoid Receptor.** Jing Li, E. Brad Thompson and Vincent J Hilser, Johns Hopkins University

52. **Mechanisms of ATP Hydrolysis and Polypeptide Translocation Catalyzed by the E. coli ClpB protein Unfoldase.** Tao Li and Aaron Lucius, University of Alabama at Birmingham

53. **ClpB Assembly.** JiaBei Lin, Keith Veronese, Tao Li and Dr. Aaron Lucius, University of Alabama at Birmingham

54. **Investigation of Protein-ligand Interactions on a Proteomic Scale**
Pei-Fen Liu and Chiwook Park, Duke University

55. **Deciphering the role of the transmembrane domain in AcrB trimerization**
Wei Lu, Qian Chai, Yinan Wei*, University of Kentucky

56. **Characterization of persistent long range contacts in the denatured state ensemble**
Nicholas Lyle and Rohit V. Pappu, Washington University

Session II

57. **Redesigning procaspase-8 dimer-interface improves its dimerization and increases apoptosis.** Chunxiao Ma, A.Clay Clark, North Carolina State University

58. **Calorimetric Studies of Histone (H1) binding to calf thymus DNA.** Venkata Machha, Sarah Beth Jones, Susan Wellman, Edwin A. Lewis, Mississippi State University

59. **The Importance of the Dimer Interface of Caspase-3 as an Allosteric Switch for Enzyme Activity.** Joseph J. Maciag, Denise Appel, Paul Swartz, Carla MattosA. Clay Clark, N.C. State University

60. **Preclinical Screening of Procaspase-3 Activators in Zebrafish**
Sarah H. MacKenzie & A. Clay Clark, North Carolina State University

61. **Molecular Switching in Human Adenovirus.**
N. Karl Maluf, Yang Q. and Yang, T. C., University of Colorado Denver

62. **Motions of the V-type Allosteric Enzyme Imidazole Glycerol Phosphate Synthase**
Gregory A. Manley, J. Partick Loria, Yale University

63. **Hydration of Nucleic acids Resolving stability contributions in tetratricopeptide repeats**
JD Marold, TP Dao, T Aksel, A Majumdar, and D Barrick, Johns Hopkins University

64. **How Translation Speed Affects Protein Folding**
Andrew Martens, Alex Chin, James Wrabl, Vince Hilser, Johns Hopkins University

65. **Homodimerization of a Single Domain Anti-Picloram (VHH) Antibody**
Kimberly M. Martin and James R. Horn, Northern Illinois University

66. **Thermodynamics of Inhibition of Deleterious Action of Human Tumor Necrosis Factor Alpha.** J. Marušič, S. Jevševar, D. Kuzman, Č. Podlipnik, J. Lah, University of Ljubljana

67. **Characterization of PACT and its interaction with PKR**
Christopher B. Mayo and James L. Cole, UConn

68. **AGT-DNA binding: cooperativity and repair**
Manana Melikishvili and Michael G. Fried, University of Kentucky

69. **Membrane protein stability Substrate Interactions Of A Human DNA Alkyltransferase**
Manana Melikishvili, Ingrid Tessmer and Michael G. Fried, University of Kentucky

70. **Characterization of the zinc finger region of cytoplasmic polyadenylation element-binding protein (CPEB).** Daniel Merkel, Bryce Hilburn, Sarah Wells, Jeff Allen, Stephanie Geiser, Brian Lee, Southern Illinois University Carbondale

71. **Single Turnover Chemical Quenched Flow Applied to ATP-Dependent Proteolysis**
Justin M. Miller, Tao Li, and Aaron Lucius, Univ Alabama at Birmingham

72. **Recognition of Voltage-Dependent Sodium Channels by Calmodulin.** Mark S. Miller, Jesse B. Yoder, Sterling C. Martin, Brett C. Waite, Dagan Marx, Elaine Kim, Ellyn Scott Miller, Drew Tarleton, Michael D. Feldkamp, and Madeline A. Shea*, Carver College of Medicine, University of Iowa

73. **Thermodynamic dissection of estrogen receptor-promoter interactions reveals that steroid receptor family members differentially partition their binding energetics**
Amie D Moody, Michael T Miura, David L Bain, University of Colorado Denver, Anschutz Medical Campus

74. **A Protein Dynamics Investigation into Broad Ligand Specificity in the Multi-Drug Resistance Transporter, EmrE.** Emma A. Morrison, Gregory T. DeKoster, and Katherine A. Henzler-Wildman. Washington University in St. Louis

75. **Harnessing mutation data to extract residue-specific electrostatics information of the unfolded states of proteins.** Brian H. Morrow and Jana K. Shen, University of Oklahoma

76. **How can a ligand be an agonist and antagonist for the same protein?**
Hesam Motlagh and Vincent J. Hilser, Johns Hopkins University

77. **Characterization of an engineered pH-dependent single domain (VHH) antibody to explore the role of individual histidines in the observed pH sensitivity.**
Megan L. Murtaugh and James R. Horn, Northern Illinois University

78. **Structural and Functional Studies of Thrombin Allostery**
Weiling Niu, Zhiwei Chen, Prafull S. Gandhi, Austin A. Vogt, Nicola Pozzi, Leslie A. Pelc, Fatama J. Zapata, Enrico Di Cera, Saint Louis University

79. **Structure determination of RNA aptamer-protein complexes**
Frances-Camille S. Padlan, Mark Girvin and Matthew Levy and Michael Brenowitz, Albert Einstein College of Medicine

80. **Comparison of co-evolutionary network structure between subfamilies of the LacI/GalR protein family.** Daniel J. Parente, Liskin Swint-Kruse, University of Kansas Medical Center

81. **Protein Dynamics Measurements by Force Modulation Microscopy**
Zehra Parlak, Terrence Oas, Duke University

82. **The temperature dependence of amino acid side chain and peptide backbone unit transfer free energies from water to 1M urea.** Lauren Porter, Eric Root, and Matthew Auton, Baylor College of Medicine

83. **Hydrogen-deuterium exchange mass spectrometry used to identify allosterically relevant changes in pyruvate kinase.** Charulata B. Prasannan, Antonio Artigues, and Aron W. Fenton, Kansas University Medical Center

84. **Signal amplification by redox chain reaction: novel consequences of interprotein electron transfer in a cyanobacterial hemoglobin.** Matthew R. Preimesberger, Matthew P. Pond, Ananya Majumdar, Juliette T.J. Lecomte, Johns Hopkins University

85. **Biophysical Characterization of the Drosophila Corepressor Hairless in the Notch Signaling Pathway.** Ashley Reyer, Andrew Russell, Zhenyu Yuan, Rhett Kovall University of Cincinnati

86. **A Modeling System for the Deconvolution of the Coupling Energy of Synaptotagmin C2AB Domains using DSC.** Anne Rice, Anne Hinderliter, University of Minnesota Duluth

87. **Bridging the Gap Between Energetics and Function: Quantitative Analysis of Full-Length Human Glucocorticoid Receptor.** James P. Robblee, Qin Yang, Michael T. Miura, David L. Bain, University of Colorado

88. **Use of internal ionizable groups to charge across the folding landscape of proteins** Aaron Robinson, Jamie Schlessman and Bertrand Garcia-Moreno, Johns Hopkins University

89. **Small molecular activators of Procaspase-8.** Bryan M. Rogers, Sarah H MacKenzie, A. Clay Clark. North Carolina State University,

90. **The Influences of T Cell Receptor Dynamics on pMHC Recognition** Daniel R. Scott, Steven. A. Corcelli, and Brian M. Baker, University of Notre Dame

91. **The K Homology Domain of Conserved Virulence Factor A.** Jinsai Shang, Rebecca Weber, Stephanie Geiser, Gabriela Pérez-Alvarado, Kyu Hong Cho, and Brian Lee, Southern Illinois University Carbondale

92. **pH-dependent population shift and water penetration in engineered mutants of Staph nuclease.** Chuanyin Shi and Jana Shen, University of Oklahoma

93. **Characterization of the Anti-Methotrexate VHH Interface to Engineer pH Dependent Recognition.** Christopher Smith & James Horn, Northern Illinois University

94. **Calmodulin conformational binding entropy is driven by transient salt bridges** Dayle M.A. Smith, T.P. Straatsma, Thomas C. Squier, Pacific Northwest National Laboratory

95. **Cap structures reduce β-helix aggregation propensity.** Jennifer L. Starner-Kreinbrink, Allen Wayne Bryan Jr., Bonnie Berger & Patricia L. Clark, University of Notre Dame

96. **The use of Pressure Perturbation Calorimetry to characterize the volume of cavities and voids in globular proteins.** Saba Suladze and George Makhatadze, Rensselaer Polytechnic Institute

97. **Functional contributions of nonconserved amino acids to homologs.** Liskin Swint-Kruse and Sudheer Tungtur, KU Medical Center

98. **Thermodynamic description of an RNA ion atmosphere simultaneously populated with magnesium and putrescine.** Robert J. Trachman, David E. Draper, Johns Hopkins University

99. **Structure of DNA Four-Way Junctions: Effect of Ions and Proteins.** C. Iulia Vitoc, Olga Buzovetsky, Jacob Litke, Yan Li and Ishita Mukerji, Wesleyan University

100. **Why is the Dimerization in Neural-Cadherin Calcium Dependent?** Nagamani Vunnam and Susan Pedigo, University of Mississippi

101. **Cracking the code of MD recognition.** Herschel Wade, Johns Hopkins University SOM

102. **S100 Proteins and the p53 Peptide: Specificity and Thermodynamic Characterization** Lucas. N. R. Wafer, Darren Blake, Tony Chiarella, and George. I. Makhatadze, Rensselaer Polytechnic Institute

103. **Unraveling a delicate electrostatic network in the pH-dependent relay of spider silk protein.** Jason A. Wallace and Jana K. Shen, University of Oklahoma

104. **Cro Variants to Distinguish Kinetic and Equilibrium Control of Gene Circuits** Lei Wang and Mike Mossing, University of Mississippi

105. **Thermodynamic Studies of Deinococcus radiodurans Type I DNA polymerase.** J. D. Warfel and V.J. LiCata, LSU

106. **Do RRM Backbone Dynamics Influence RNA Binding Preferences?** Sandra G Williams, Gregory T DeKoster, Kathleen B Hall, Washington University-St Louis

107. **The Dimer Interface of SecA.** Andy J. Wowor, Sarah M. Auclair, Dongmei Yu, Ping Zhao, Debra A. Kendall, and James L. Cole, University of Connecticut

108. **Monitoring the individual motor activities of RecB and RecD within the E. coli RecBCD Helicase.** Fuqian Xie, Colin G. Wu and Timothy M. Lohman, Washington University in St. Louis

109. **Structural studies of theTiam1 PHnCCEx domain alone and in complex with the Par3-CC.** Zhen Xu, Ann M. Murray, Monika Joshi, Lokesh Gakhar and Ernesto J. Fuentes, University of Iowa

110. **Assembly of the Adenoviral IVa2 and L4-22K proteins on viral DNA Packaging Sequences.** Teng-Chieh (Jay) Yang, Qin Yang, N. Karl Maluf, University of Colorado Denver, Anschutz Medical Campus

111. **Stability of AcrB trimer and function of AcrAB-TolC pump.** Linliang Yu and Yinan Wei, University of Kentucky