

TSRC Summer School on Fundamental Science for Alternative Energy

Tuesday, June 24, 2014 – Saturday, June 28, 2014

Organizers: Victor Batista and Gary Brudvig

TSRC hosts: Nana Naisbitt 970-708-0004 and Rory Sullivan 970-708-4542

Address of the meeting: Telluride Intermediate School, 725 W. Colorado Ave, Telluride CO 81435

The 2014 TSRC Summer School on Fundamental Science for Alternative Energy will introduce principles, methods, and approaches relevant to the design of molecular transformations, energy transduction, and current applications for alternative energy. Energy and environment are likely to be key themes that will dominate the way science and engineering develop over the next few decades. Only an interdisciplinary approach can be expected to succeed in the face of problems of such difficulty – hence the team-taught structure of the TSRC Summer School. We hope this course will inspire a new generation of scientists to continue work in the field, or at least to have something of an insider's point of view as the field develops in the next few decades.

The tentative list of topics and instructors, in order of appearance, includes: Thomas Moore (TM) will introduce the scientific basis behind environmental changes the problem that drives the whole alternative energy project and will provide fundamental concepts on design of bioinspired photocatalytic assemblies. Robert Crabtree (RC) will introduce fundamental concepts of inorganic/organometallic catalysts for water oxidation, green fuel production and the virtual hydrogen fuel-cell project. Gary Brudvig (GB) will discuss biophysical principles of light-harvesting, charge separation and fuel production revealed by studies of the natural systems and related to artificial electrochemical processes. Ana Moore (AM) will discuss approaches for synthesis of artificial antenna molecular frameworks for solar light harvesting and characterization of energy/charge transfer in synthetic molecular assemblies. Charles Schmuttenmaer (CS) will discuss properties of semiconductor materials that make up photocatalytic solar cells and characterization based on spectroscopic methods. Mark Ratner (MR) will introduce theoretical aspects of charge transport and organic electronics. Peter Rossky (PR) will discuss molecular modeling methods for simulations of electronic excitations relevant to organic photovoltaic devices, and Victor Batista (VB) will introduce computational methods for design and characterization of molecular systems and applications to solar cells, photocatalysis and biomimetic water-splitting.

FACULTY

Bob Crabtree (BC) (catalysts and ligand design)

Ana Moore (AM) (antenna synthesis, characterization of energy/charge transfer)

Tom Moore (TM) (design of bioinspired photocatalytic assemblies)

Charlie Schmuttenmaer (CS) (semiconductor materials + spectroscopy of carriers)

Gary Brudvig (GB) (natural photosynthesis and biomimetic systems+EPR spectroscopy+electrochemistry)

Peter Rossky (PR) (modeling organic PV)

Mark Ratner (MR) (modeling transport, organic electronics)

Victor Batista (VB) (modeling PSII and DSSC)

Meeting Schedule

Monday June 23		Tuesday June 24
Morning	Arrival Day	Research Interests
8:30-9:00		Breakfast
9:00-9:10		Welcome and Introductions
9:10-9:30		<i>T. Moore</i>
9:30-9:50		<i>Crabtree</i>
9:50-10:10		<i>Brudvig</i>
10:10-10:30		<i>A. Moore</i>
Break		
11:00-11:20		<i>Schmittenmaer</i>
11:20-11:40		<i>Ratner</i>
11:40-12:00		<i>Rossky</i>
12:00-12:20		<i>Batista</i>
Afternoon		Free Time
Evening		
6:00-8:00	Informal gathering at Arroyo Wine Bar and Gallery, 220 E. Colorado Ave., for a “meet and greet” (cash bar)	Student and Postdoc Presentations (5 minutes each)

	Wednesday June 25	Thursday June 26	Friday June 27	Saturday June 28
Morning	Significance + Fundamentals	Transport+ Semiconductors	Significance + Fundamentals	Molec/Electronic Dynamics
8:30-9:00	Breakfast	Breakfast	Breakfast	Breakfast
9:00-9:30	<i>T. Moore:</i>	<i>Schmittenmaer:</i>	<i>T. Moore:</i>	<i>Rosky:</i>
9:30-10:00	Lecture 1	Lecture 1	Lecture 2	Lecture 2
10:00-10:30	Discussion 1	Discussion 1	Discussion 2	Discussion 2
Break			Natural/Artificial Light Harvesting	
11:00-11:30	<i>Crabtree:</i>	<i>Ratner:</i>	<i>Brudvig:</i>	<i>Batista:</i>
11:30-12:00	Lecture 1	Lecture 1	Lecture 2	Lecture 2
12:00-12:30	Discussion 1	Discussion 1	Discussion 2	Discussion 2
Afternoon	Natural/Artificial Light Harvesting	Molec/Electronic Dynamics		
2:00-2:30	<i>Brudvig:</i>	<i>Rosky:</i>	<i>A. Moore:</i>	
2:30-3:00	Lecture 1	Lecture 1	Lecture 2	
3:00-3:30	Discussion 1	Discussion 1	Discussion 2	
Break			Transport+ Semiconductors	
4:00-4:30	<i>A. Moore:</i>	<i>Batista:</i>	<i>Schmittenmaer:</i>	
4:30-5:00	Lecture 1	Lecture 1	Lecture 2	
5:00-5:30	Discussion 1	Discussion 1	Discussion 2	
Evening				
6:00-8:00	Picnic, Ah Haa School for the Arts, 300 S. Townsend	BBQ at Bear Creek Lodge (sponsored by ACS)	<i>Ratner:</i> Lecture 2 Discussion 2	