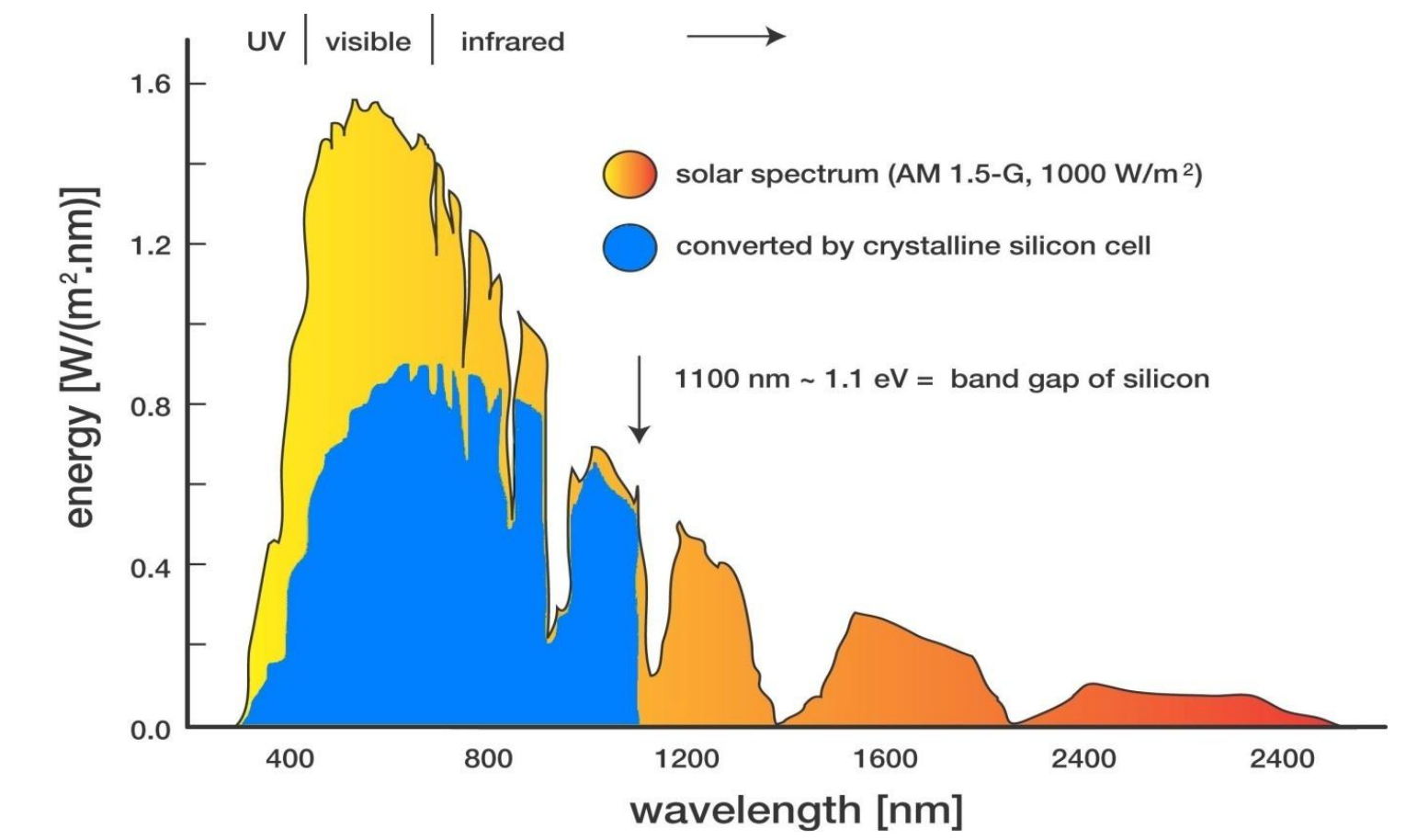
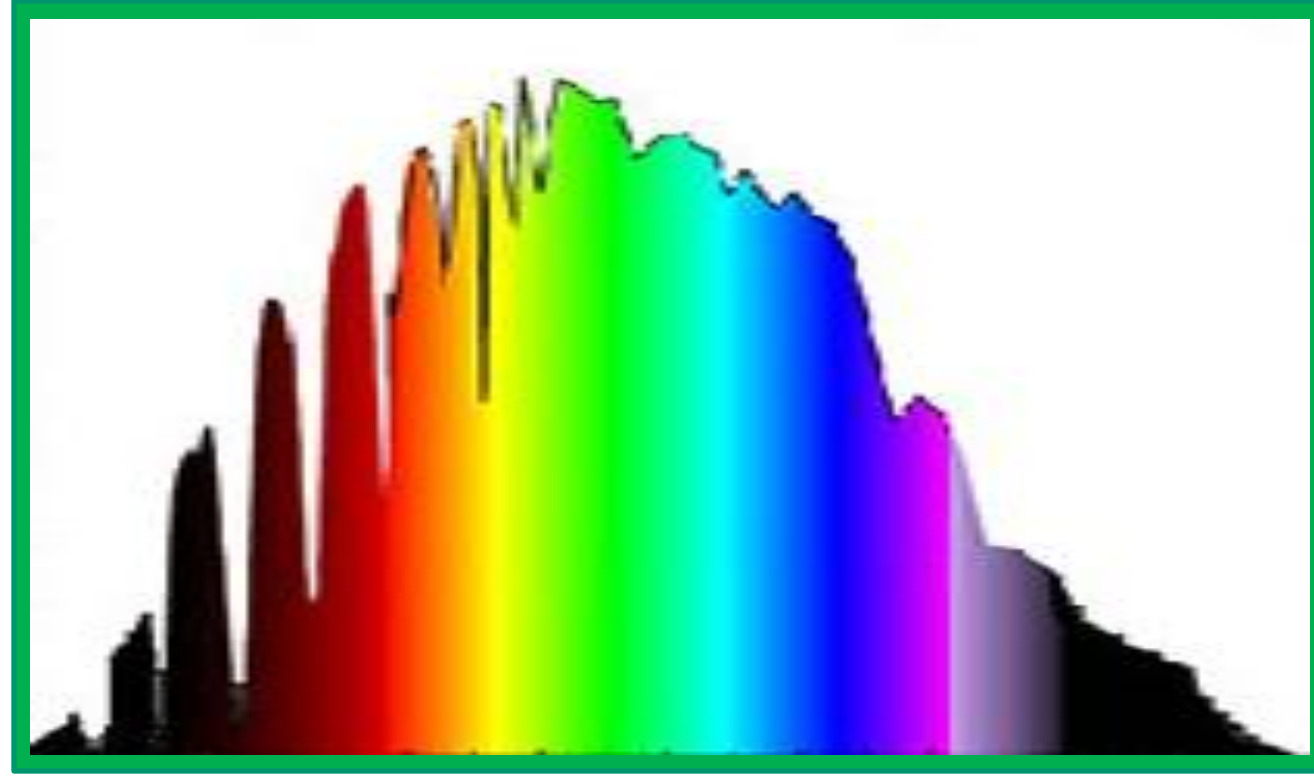


IGERT: Nanostructured Solar Cells: Materials, Processes, and Devices (DGE- 0903685)

Mary Berry, Stanley May, Ranjit Koodali, The University of South Dakota
David Galipeau, South Dakota State University
Jon Kellar, South Dakota School of Mines and Technology



The South Dakota IGERT on Nanostructured Solar Cells engaged its first cohort of nine students in Fall 2010. These students are part of a larger collaborative referred to as the Photo-Activated Nanoscale Systems (PANS) group, who met in Chamberlain, SD in June 2010 to first launch the IGERT program.



Pans All Investigator Meeting , June 2010

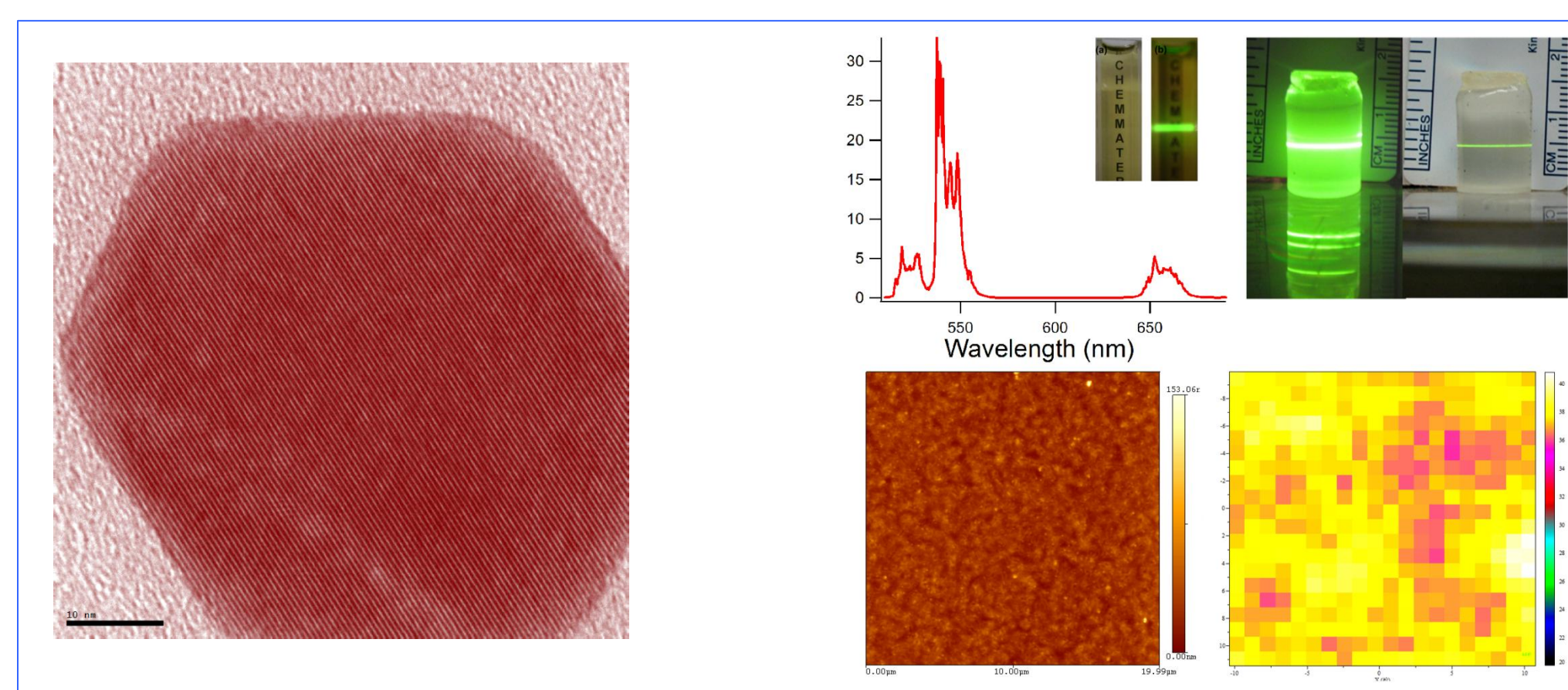
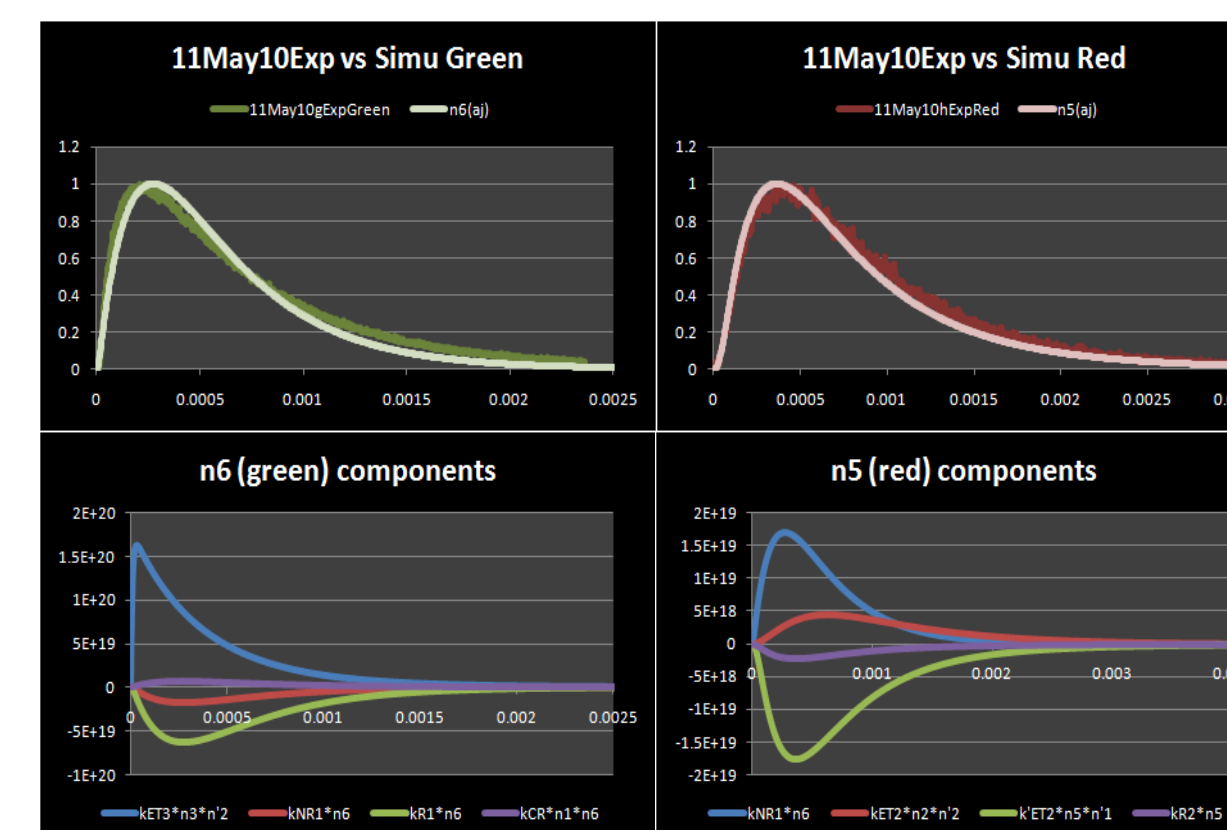
Research is conducted within three interdisciplinary emphases:

- Emphasis #1: Luminescent Solar Concentrators (LSC)**
- Emphasis #2: Excitonic Solar Cells (ESC)**
- Emphasis #3: Photoelectrochemical Cells (PEC)**

Collaboration is enhanced by student inter-campus, interdisciplinary lab rotations. Students spend one semester in a collaborators laboratory working on complementary aspects of their dissertation project.



Rob Anderson from SDSM&T models up-conversion dynamics at USD.



Highly crystalline NaYF₄:Yb, Er up-conversion nanocrystals in solution, in monoliths, and as thin films.

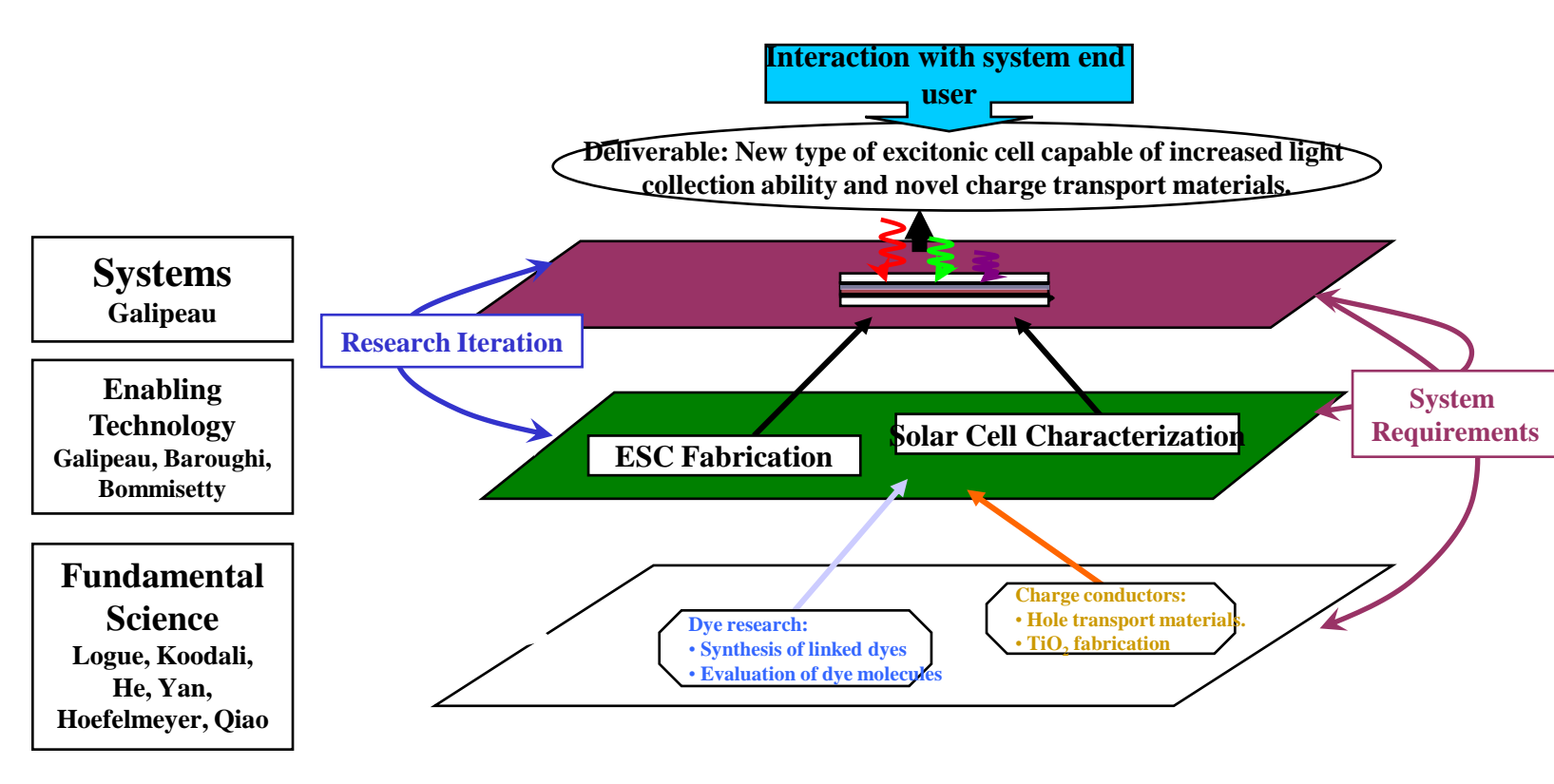
Internships are provided through partnership with the National Center for Photovoltaics (NREL), Covidien (Mallinckrodt-Baker), General Atomics, and Radiance Corporation.



IGERT student, Daren Davoux (SDSU, EE) intern with Radiance Technologies

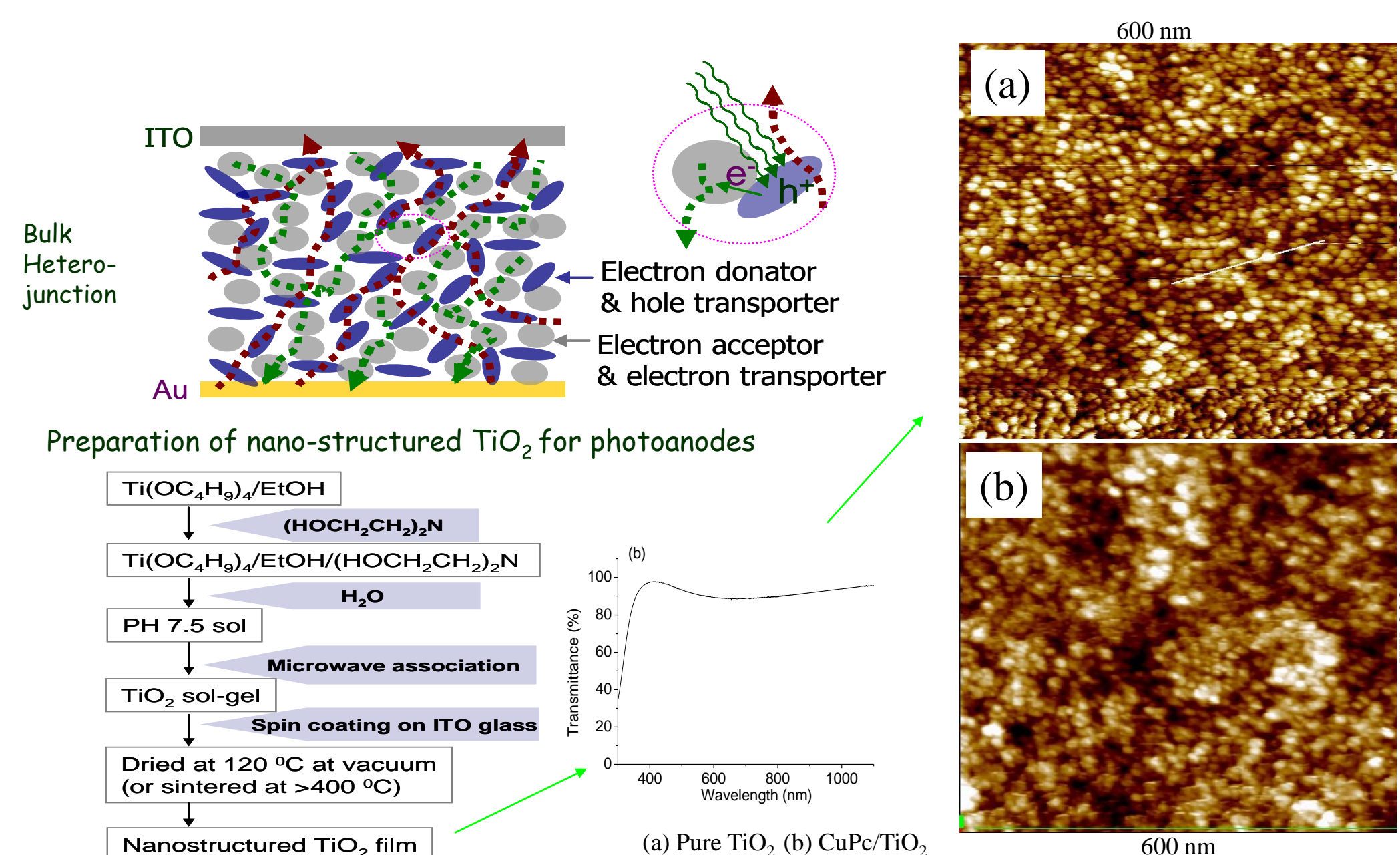
Educational Outreach: IGERT students design and execute educational outreach projects under the umbrella of the Northern Plains Undergraduate Research Center (NSF-URC), the Research Apprenticeship Program (NIH-BRIN), or SDSU's Success Academy.

Dye-Sensitized Solar Cells Group



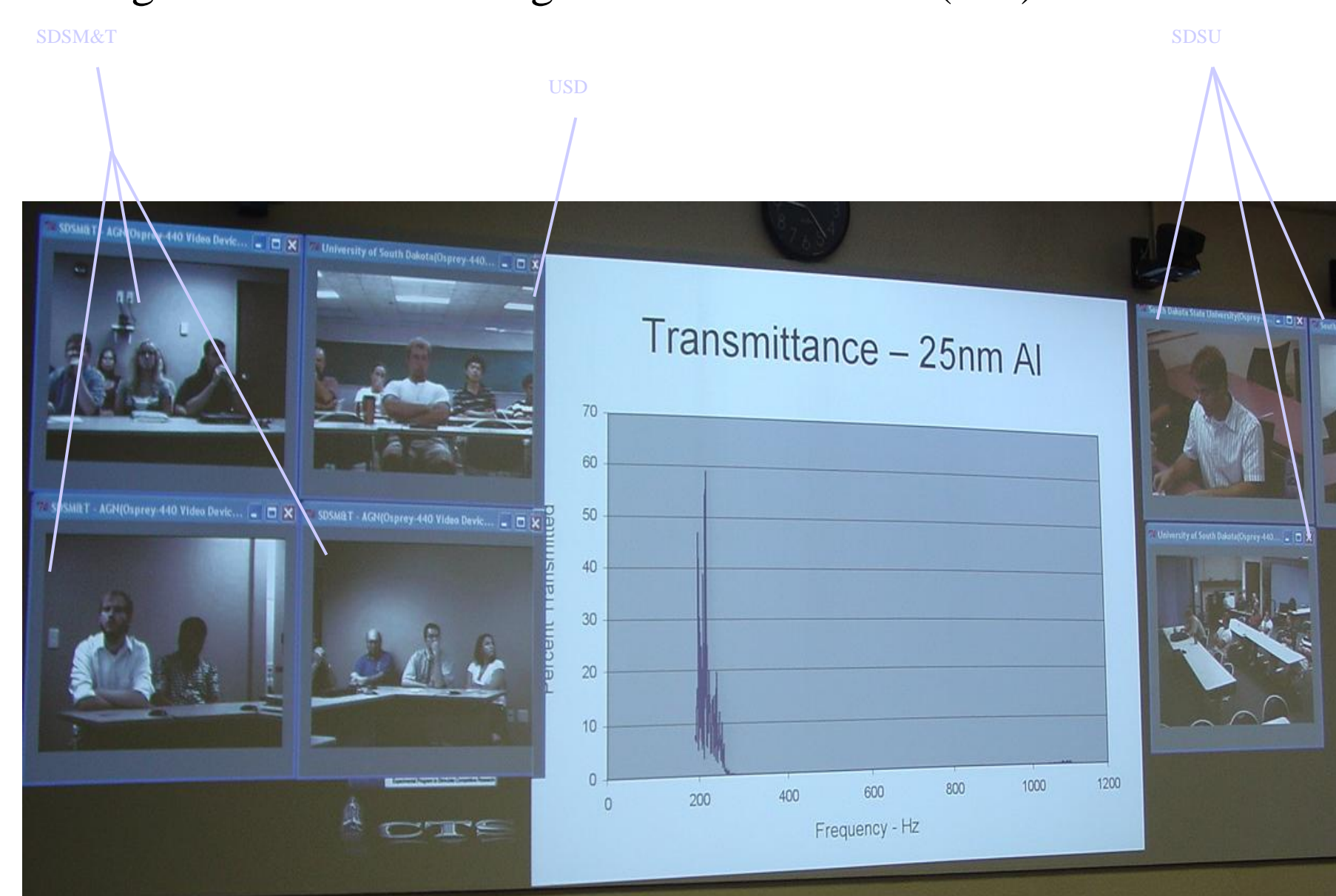
Organization plan for the DSSC group in the ESC emphasis.

Bulk Heterojunction with TiO₂ Aerogels



A DSSC project for phthalocyanine sensitization of high surface area TiO₂

Shared Coursework, Seminars, and Group Meetings are facilitated through video conferencing on the Access Grid (AG).



Schedule for upcoming AG Course Offerings

Spring 2011

Printed Electronics: Materials and Processes (SDSM&T)
Advanced Photovoltaics (SDSU)

Fall 2011

Fundamentals of Photovoltaics (SDSU)
Organic Electronics (SDSU)

Spring 2012

Advanced Photovoltaics (SDSU)
Synthesis and Characterization of Nanomaterials (USD)

Fall 2012

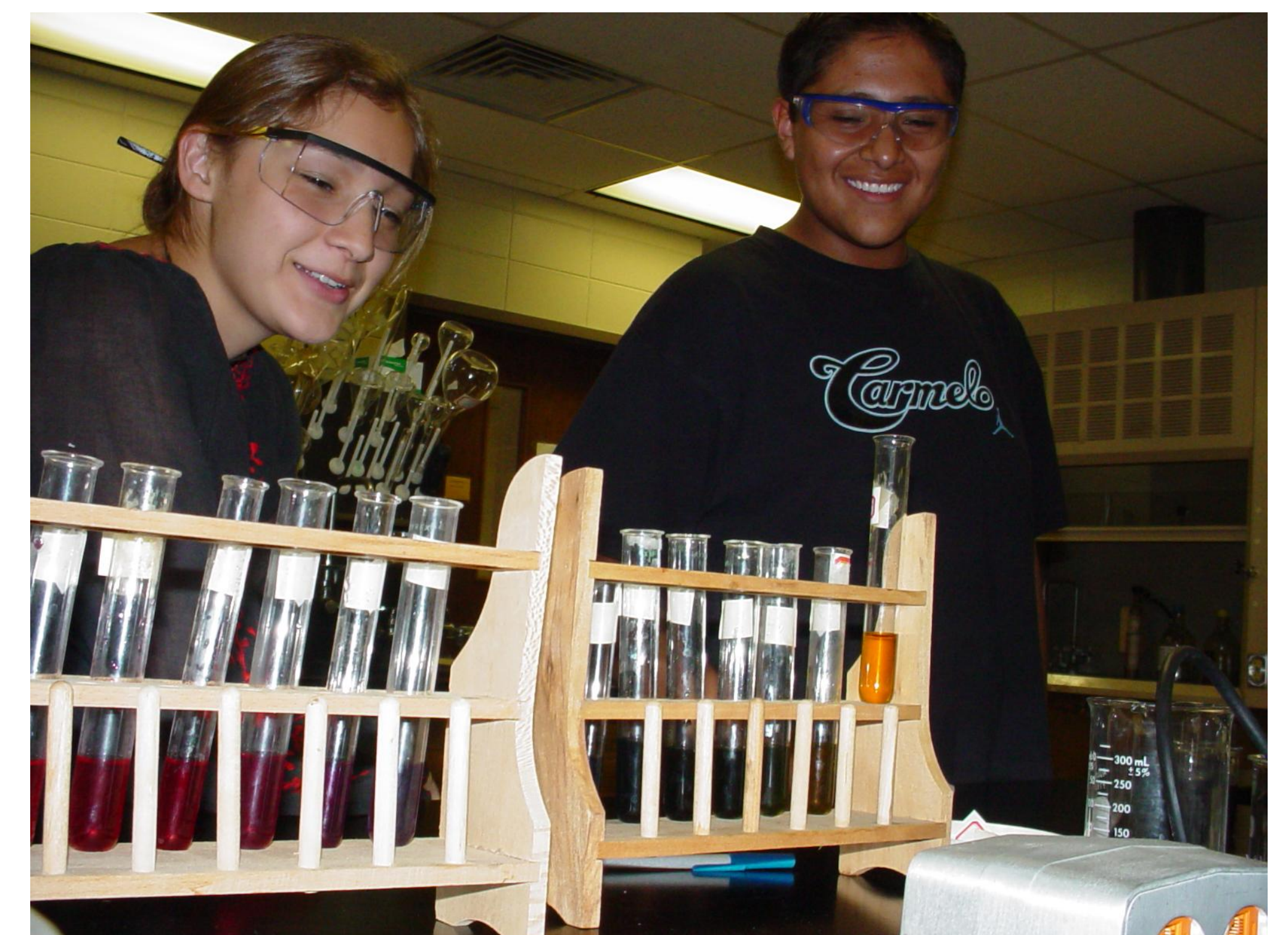
Luminescence of Materials (USD)

Spring 2013

Fundamentals of Photovoltaics (SDSU)

Fall 2013

Theory and Applications of Nanomaterials (SDSM&T)



Introduction to Research Workshop with students from Nebraska Indian Community College

Acknowledgement:

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Thanks to DoD and DOE and NSF for research support for the projects in which the IGERT trainees are engaged.
Thanks to the South Dakota Governor's Office of Economic Development for significant investment in PANS/IGERT research infrastructure development.