

XUANHONG CHENG

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EDUCATION AND RESEARCH EXPERIENCES

Ph.D. Student, Bioengineering, University of Washington, Seattle, WA *06/99-present*

Thesis Advisor: Buddy Ratner, Ph.D.

Current GPA: 3.80/4.0

Research Summary

- Plasma polymerization of temperature sensitive polymer, microheater development, and controllable patterning of proteins and/or cells (thesis project).
- Imprinting of randomly adsorbed proteins and crystallization of streptavidin (lab rotation).
- Preliminary study of platelet adhesion on tetraglym surfaces at the static state (lab rotation).

Thesis Project Description

My research project is to build micro-patterned temperature responsive polymer coatings for protein and cell array applications. In our lab temperature responsive poly(*N*-isopropylacrylamide) (pNIPAM) films are conveniently coated onto various surfaces by radio-frequency glow discharge (RFGD) plasma deposition (ppNIPAM). The coatings are resistant to both protein adsorption and cell adhesion at room temperature, but turn fouling at 37°C. A microheater array is designed that by depositing ppNIPAM onto them, we can control the phase transition of the polymer spot by spot through the individual micro-heater. When the ppNIPAM coated microheater array is incubated sequentially in different protein solutions and/or cell suspensions with different heaters turned on, proteins and cells are patterned on different spots of the same chip. The patterning process is programmable and has wide applications in proteomic chip design, cell function study, tissue engineering, and etc.

Graduate Student, Molecular and Cellular Biology, University of Arizona, Tucson, AZ

Cumulative GPA: 4.0/4.0 *08/98--06/99*

Advisors: Murry Brilliant, Ph.D., Robert Gillies, Ph.D., Mark Haussler, Ph.D., Henry Yamamura, Ph.D.

Research Summary

- Cloning of a vitamin-D receptor gene from the mouse genome DNA (lab rotation).
- Construction of an *E. coli* expression plasmid carrying a mouse *ep* gene (lab rotation).
- Preliminary study of the potential of diffusion weighted MR imaging for prognostic use in following chemotherapeutic response (lab rotation).
- Preliminary study of the down-regulation of CB1 receptor on CHO-1f cells after chronic treatment with CB1 receptor agonist (lab rotation).

B.S., Biology, Wuhan University, Wuhan, China *08/94--07/98*

Cumulative GPA: 3.86/4.0

Research Advisor: Yipeng Qi, Ph.D.

Research Summary

- Construction of an adenovirus vector carrying p53 and gfp genes and examination of its effect on tumor cells.

TECHNICAL SKILLS

- **Biological:** Protein radiolabeling, fluorescent protein labeling, protein adsorption, cell culture, cell adhesion, immunocytochemistry and DNA cloning.
- **Surface analytical:** Electron-Spectroscopy for Chemical Analysis (ESCA), Time of Flight Secondary Ion Mass Spectroscopy (ToF-SIMS), Surface Plasmon Resonance (SPR), Infrared Spectrometry, Sum Frequency Generation Spectrometry and light microscopy.
- **Chemical:** Polymerization by plasma deposition (RFGD), self-assembled monolayers (SAMs) and experience with ¹²⁵I and ³H radioisotopes
- **Electrical:** cleanroom techniques such as photolithography, sputtering and etching. Familiarity with digital and analog circuit design, device physics, optics and MEMS.

HONORS AND AWARDS

- Society For Biomaterials 2004 Student Award for Outstanding Research (Ph.D. category), 7th World Biomaterials Congress, Sydney, Australia, 2004
- Outstanding Graduate Female of Society of Women Engineers, University of Washington, Seattle, WA, 2004
- Honorable Mention, Society for Biomaterials 29th Annual Meeting, Reno, NV, 2003
- Honorable Mention, Society for Biomaterials 28th Annual Meeting, Tampa, FL, 2002
- Renmin Fellowship, Wuhan University, Wuhan, China (1995 - 1998)

PROFESSIONAL MEMBERSHIPS

American Chemical Society
American Vacuum Society
Society for Biomaterials, USA

PUBLICATIONS

Xuanhong Cheng, Yanbing Wang, Yael Hanein, Karl F. Böhringer and Buddy D. Ratner, "Novel Cell Patterning Using Thermoresponsive Surface Chemistry". (Accepted by *Journal of Biomedical Materials Research*)

Heather E. Canavan, Xuanhong Cheng, Buddy D. Ratner, David G. Castner. "Characterization of the Extracellular Matrix upon Cell Detachment from a Thermoresponsive Polymer". (Under review)

CONFERENCE PRESENTATIONS

Xuanhong Cheng, Yanbing Wang, Yael Hanein, Karl Bohringer and Buddy D. Ratner, "Cell Behavior and Patterning on Plasma Polymerization Thermal Responsive Coatings". Society for Biomaterials 29th Annual Meeting, May 2003, Reno, NV. (*Oral Presentation*)

Xuanhong Cheng, Yanbing Wang, Yael Hanein, Karl Bohringer and Buddy D. Ratner, "Temperature-Responsive Polymer Coatings by Plasma Polymerization and the Applications for Protein and Cell Patterning". American Vacuum Society 49th International Symposium, November 2002, Denver, CO. (*Oral Presentation*)

Xuanhong Cheng, Yanbing Wang, Yael Hanein, Karl Bohringer and Buddy D. Ratner, "Synthesis of Temperature-Responsive Polymer Coatings by Plasma Polymerization and the Protein Adsorption Properties". Society for Biomaterials 28th Annual Meeting, May 2002, Tampa, FL. (*Oral Presentation*)

PATENT APPLICATION

"Apparatus and Methods for Binding Molecules and Cells" (OTL Ref. No.'s 2061-3773-4435PT (U.S.) & 2061-3773-4437PT (PCT)). Filed, July 30th, 2003.