

## Carl D. Saquing, Ph.D.

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**OBJECTIVE** A challenging position in an innovation driven environment bringing my technical, management, interpersonal skills and more than 6 years of experience in nano- and bio-materials synthesis, processing and characterization to develop new products and processes and help bring about overall growth of business.

### EDUCATION

Postdoctoral Fellow, STC Program, National Science Foundation, North Carolina State University

*Adviser:* Prof. Saad A. Khan

PhD, Chemical Engineering, University of Connecticut, Storrs, CT (GPA: 3.71 / 4.00) 2005

Thesis: "Incorporation of Nanoparticles by Different Supercritical Deposition Methods"

*Adviser:* Prof. Can Erkey

ME, Chemical Engineering, University of New South Wales (UNSW), Sydney, Australia 1998

Thesis: "Solubility Behavior of Hydroxybenzoic Acid Isomers in Entrainer-Doped SC CO<sub>2</sub>"

*Advisers:* Prof. Neil R. Foster, Dr. Frank Lucien

**AWARD** Australian Agency for International Development (AusAID) Scholarship 1995-1997

### PROFESSIONAL EXPERIENCE

Postdoctoral Research Associate, North Carolina State University 2005 - present

- Developed novel methods to fabricate nanoparticle-polymer composites and hollow nanofibers using electrospinning coupled with *in situ* reduction, atomic layer deposition or nanoparticle electrostatic self-assembly for biomedical and catalytic applications.
- Designed and built high temperature solution electrospinning apparatus that achieved high yield and reduced solvent consumption.
- Successfully designed and used novel supercritical gas and gas-expanded liquids to perform oxidations of biomass to produce high-value chemicals and biofuels. Evaluated oxidation products using advanced NMR, GPC and GC-MS techniques.

Research and Teaching Assistant, University of Connecticut 2001 – 2004

- Developed novel supercritical deposition methods to synthesize effectively metal (Pt, Ru) nanoparticles (2-20 nm) supported on various nanoporous substrates such as carbon and silica aerogels for fuel cell and hydrogenation applications. The resulting nanocomposites were characterized by TEM, SEM, XRD, TGA, Physisorption and Chemisorption Analyses, FTIR and GC-MS.
- Designed strategies to prepare stabilized drug-loaded biodegradable polymeric nanoparticles for drug delivery and foams for medical devices using supercritical fluids. Evaluated the morphology and physico-chemical properties of drug-loaded polymeric nanoparticles and foams by TEM, SEM, OM and HPLC and sorption techniques.
- Performed polymerizations in SC CO<sub>2</sub> and CHClF<sub>2</sub> at different temperatures, pressures and catalyst concentrations and characterized the polymerization products by NMR and GPC techniques.
- Took graduate classes in materials and polymer characterization, advanced chemical engineering thermodynamics, heat and mass transfer and reaction engineering.

Research Assistant, School of ChE & Industrial Chem, UNSW (Australia) 1995-1997

- Investigated the solubility behavior of individual and mixed model drug isomers in cosolvent-doped SC CO<sub>2</sub> by experimentally measuring and thermodynamically modeling ternary and quaternary solubility data. HPLC and UV/Vis spectroscopy were used as analytical techniques.

Asst. Professor, Univ. of the Philippines/Research Engineer, TechnoQuest Co. 1991-2001

- Taught undergraduate and graduate chemical engineering and chemistry classes, and was part of a research and development team that designed and supervised the construction of a benzene, toluene and xylene (BTX) plant for TechnoQuest Corporation.

### SELECTED REFEREED/SUBMITTED/IN PREPARATION PUBLICATIONS

1. "Electrospun Nanoparticle-Nanofiber Composites *via* A Novel One-step Synthesis" **C.D. Saquing**, J. Manasco, S.A. Khan, *Submitted to **Small***. [Draft available]
2. "Porous Nylon 6 Fibers *via* a Novel Salt-Induced Electrospinning Method" A. Gupta, **C.D. Saquing**, M. Afshari, S.A. Khan, R.Kotek, *Submitted to **Macromolecules***. [Draft available]

3. "Bi-Directional Kirkendall Effect for Fabrication of Tube-in-Tube Nano-Assemblies Using Atomic Layer Deposition" Q. Peng, X. Y. Sun, J.C. Spagnola, **C.D. Saquing**, R. J. Spontak, S.A. Khan, G.N. Parsons, *Submitted to **Small***. [Draft available]
4. "Surfactant-assisted electrospun alginate-based polymer blend nanofibers and nanocomposites for biomedical applications" **C.D. Saquing**, J. Manasco, J. M. Saquing, C. Bonino, F. delos Reyes and S.A. Khan, *In preparation for submission to **Biomacromolecules***. [This paper was presented at the 235th ACS Spring National Mtg, New Orleans, LA, Apr 6-10, 2008.]
5. "pH activated nanoparticle self-assembly in polymer nanofiber surfaces as catalysts for nitrophenolic compounds" **C.D. Saquing**, J. Genzer and S.A. Khan, *In preparation for submission to **Adv Materials***. [This paper was presented at the 235th ACS Spring National Mtg, New Orleans, LA, Apr 6-10, 2008.]
6. "High throughput nanofiber production via electrospinning of polycaprolactone melts" J. Manasco, **C.D. Saquing**, J. Hinestroza, S.A. Khan, *In preparation for submission to **Macromolecules*** [Draft available]
7. "Preparation and characterization of silica nanoparticulate-polyacrylonitrile composite and porous nanofibers" L. Ji, **C.D. Saquing**, S.A. Khan and X. Zhang, *Nanotechnology*, 19 (085605), 2008.
8. "Solubilizing amino acids and polypeptides in supercritical carbon dioxide via reverse micelle formation" N.U. Soriano, R. Venditti, **C.D. Saquing**, D. Bushey, D.S. Argyropoulos. *Colloids and Surfaces A: Physicochem. Eng. Aspects*, 2008, 315, 110-116.
9. "Toward a Better Understanding of the Lignin Isolation Process from Wood" A. Guerra, I. Filpponen, L.A. Lucia, **C.D. Saquing**, S. Baumberger, D.S. Argyropoulos. *J. Agric. Food Chem.* 54, 5939, 2006.
10. "Investigation of the Supercritical Deposition of Platinum Nanoparticles into Carbon Aerogels" **C.D. Saquing**, D. Kang, M. Aindow and C. Erkey. *Micropor Mesopor Mater*, 2005, 80, 11-23.
11. "Preparation of Drug Delivery Biodegradable PLGA Nanocomposites and Foams by Supercritical CO<sub>2</sub> Expanded ROP and by Rapid Expansion from CHClF<sub>2</sub> Supercritical Solutions" A.D. Asandei, C. Erkey, D.J. Burgess, **C.D. Saquing**, G. Saha and B.S. Zolnik, *Mater Res Soc Symp Proc*, 2005, 845, 243-248.
12. "Supported Platinum Nanoparticles by Supercritical Deposition" Y. Zhang, D. Kang, **C.D. Saquing**, M. Aindow and C. Erkey. *Ind Eng Chem Res*, 2005, 44, 4161-4164.
13. "Preparation of Platinum/Carbon Aerogel Nanocomposites Using a Supercritical Deposition Method" **C.D. Saquing**, T.T. Cheng, M. Aindow and C. Erkey. *J Phys Chem B*, 2004, 108, 7716-7722.
14. "High-Resolution TEM Characterization of Carbon Aerogels as Catalyst Supports", D. Kang, Y. Zhang, **C.D. Saquing**, C. Erkey and M. Aindow. *Mater Res Soc Symp Proc*, 2003, 800, 367-372.
15. "Steric Effects and Preferential Interactions in Supercritical CO<sub>2</sub>" **C.D. Saquing**, F.P. Lucien and N.R. Foster. *Ind Eng Chem Res*, 1998, 37, 4190-4197.

#### SELECTED CONFERENCE PRESENTATIONS

1. "Electrospun metal nanoparticle-alginate polymer blend nanofiber composites for biomedical applications" **C.D. Saquing**, J. Manasco, J. M. Saquing, C. Bonino, F. delos Reyes and S.A. Khan, The Fiber Society Spring Meeting, Mulhouse, France, May 14-16, 2008. [Oral]
2. "Metal nanoparticles-loaded Al<sub>2</sub>O<sub>3</sub> microtubes by atomic layer deposition on electrospun nanofiber templates" **C.D. Saquing**, Q. Peng, J. Manasco, G. Parsons and S.A. Khan, The Fiber Society Spring Meeting, Mulhouse, France, May 14-16, 2008. [Poster]
3. "Metal nanoparticles-loaded Al<sub>2</sub>O<sub>3</sub> microtubes by atomic layer deposition on electrospun nanofiber templates" **C.D. Saquing**, Q. Peng, J. Manasco, G. Parsons and S.A. Khan, 235<sup>th</sup> ACS Spring National Mtg/ AIChE Spring National Meeting, New Orleans, LA, Apr 6-10, 2008. [Oral and Poster]
4. "Electrospun metal nanoparticle-alginate based polymer blend nanofiber composites for biomedical applications" **C.D. Saquing**, J. Manasco, J. M. Saquing, C. Bonino, F. delos Reyes and S.A. Khan, 235<sup>th</sup> ACS Spring National Mtg, New Orleans, LA, Apr 6-10, 2008. [Oral]
5. "Metal nanoparticle-polymer fiber nanocomposite processing via a novel one-step electrospinning" **C.D. Saquing** and S.A. Khan, AIChE 2007 Annual Meeting, Salt Lake City, UT, Nov 3-9, 2007.
6. "Functional nanofibers via electrospinning: from coatings to biomedical therapeutics" Khan, S. A., Talwar, S., Manasco, J., and **C.D. Saquing**, International Conference on Natural Polymers, Kottayam, India, Nov. 2007 [Invited Talk]
7. "Carbon Aerogels and C/metal Nanocomposites Formed Using Supercritical CO<sub>2</sub> Processing", M. Aindow, D. Kang, U. Kitkamthorn, **C.D. Saquing**, Y. Zhang, A. Bayrakceken, C. Erkey. 5th Brazilian Materials Research Society Meeting (SBPMat) Florianópolis, Brazil, October 8-12, 2006. [Invited Talk]

REFERENCES Available upon request