Pubudu Goonetilleke

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Objective

To obtain a position in semiconductor industry that utilizes my technical skills

Education

08/03 – to date **Ph.D. in Physics** (December 2008, expected) – Clarkson University, NewYork
Thesis title Electrochemical Investigations of Advanced Materials for Microelectronic and Energy Storage Devices

08/03 – 12/04 **M.S. in Physics** – Clarkson University, NewYork

09/97 – 01/02 **B.S. in Physics** (Honors, Mathematics minor), University of Colombo, Sri Lanka
Thesis title A low cost telephone-interfaced equipment protector and a PC based low cost data acquisition system for physics applications

Research Experience

- **E**lectro**C**hemical **M**echanical **P**lanarization and **C**hemical **M**echanical **P**lanarization of electronic materials
  - *Investigation of chemicals on planarization efficiency and polish rate of Copper*
  - *Electrochemical removal of Copper with pulsed anodic polarization*
  - *Construction of lab grade CMP and ECMP tools*
  - *Effect of inhibitors in CMP and ECMP*
- Electrochemical impedance spectroscopy, potentiostatic and galvanostatic techniques
- Preparation of chemicals and materials
  - *Preparation of aqueous and non aqueous solutions under controlled environmental conditions*
- Characterization of Ionic Liquids with Carbon NanoTubes for supercapacitor applications
  - *Characterization of interfacial interactions in solid electrodes and liquid ILs*
- Characterization of electrode and electrolyte materials for Li-ion batteries and supercapacitors
  - *Investigation and comparison of standard and ionic liquid based electrolytes for batteries*
  - *Investigation of lithium ion cathode materials and diffusivity in cathode materials*
- Thin film electrode preparation for Li-ion battery and supercapacitor applications

Technical skills

- **Design and construction of CMP and ECMP tools**
- Sound knowledge in digital electronics with data acquisition and PC interfacing
- Embedded system design with micro processors
- Design and construction of electrochemical cells and accessories for various applications
- Design and construction of electronic interfaces for automating experiments with remote control functions
- LabView and its applications with National Instrument's data acquisition boards and other equipment
- Basic machine shop operations

Computer skills

- **LabView**, **MultiSim/UltiBoard**, Borland Delphi, **CorrWare**, **ZPlot**, **ZSimWin** and **V3 studio electrochemical software**
- Visual Basic, C-sharp, Visual C++ in Visual studio, MATLAB and MS Office
- Microcontroller programming with C
- Knowledgeable in Computer networking and troubleshooting
- Maintained computer hardware and software for physics department teaching laboratories and in own research laboratory

Teamwork and management experience

- Teamwork with graduate and undergraduate students in our group at Clarkson University
- Team work with graduate students from department of chemical engineering at Clarkson University
- Maintained and organized inventory and purchase records for all laboratory supplies and equipment for our research lab at Clarkson University

Work experience

07/08 – to date **Teaching Assistant**, Clarkson University, New York

07/06 – 07/08 **Research Assistant**, Clarkson University, New York
- *Research, instrumentation and software development for thesis work*
- *Designing and setting up experiments in the lab*

08/03 – 05/06 **Teaching Assistant**, Clarkson University, New York - **Average teaching evaluation : 4.5/5**

02/03 – 07/03 **Computer software engineer** for InterBlocks (Pvt) Ltd, Sri Lanka
- *Designed applications in visual C++ with Open GL tools*

08/02 – 12/02 **Visiting Lecturer for Physics**, Institute for Technological Studies, Sri Lanka

01/02 – 11/02 **Lab Instructor and Research Assistant**, University of Colombo, Sri Lanka
- *Graded Laboratory Reports for Physics Major students*
- *Worked with two research groups building instruments for research*
- *Designed and upgraded undergraduate laboratory experiments for Physics Major students*
- *Physics Computer Lab Administrator*

Instrument experience

- Solatron 1287A potentiostat and 1255 frequency response analyzer
- Princeton Applied Research VERSATAT 3
- Struers LaboPol -5 polisher
- JOEL Scanning Electron microscope - Energy Dispersive X-ray microscopy
- DigiBridge LCR 1517 Conductivity meter / automated with LabView
- TestEquity 105A Environmental chamber / automated with LabView
- Consort 864 Conductivity meter
- Fourier Transformed Electrochemical Impedance Spectroscopy
- Electronic test equipment
- TC-100 Desktop spin coater
- Denton Desk IV cold sputter coater
- RS-35 four point probe
- EQ-BST8-MA 8 channel battery analyzer
- Pine instrument rotating disk electrode system

Professional qualifications

- Student member of American Physical Society
- Student member of The Electrochemical Society
- Graduate member of British Computer Society
- Diploma in Computer System Design, National Institute of Business Management, Sri Lanka
- Member of Institute of Physics, Sri Lanka (IPSL)
- Member of Sri Lanka Association for the Advancement of Science (SLASS)

Honors and activities

- **Graduate Research Assistantship** (05/06 – to date), Nano Dynamics
- **Teaching Assistantship** (08/03 – 05/06), Clarkson University
- **Outstanding Teacher Award** (2006) – Institute of Physics Teachers, USA
- Awarded 1st place for the **Most Attractive Poster** at CAMP Technical Meeting, Canandaigua, NY, May 15-17, 2008 (*Poster presentation – [5]*)
- Awarded 2nd place for the **Most Creative Poster** at CAMP Technical Meeting, Canandaigua, NY, May 15-17, 2008 (*Poster presentation – [4]*)

Patent

- Dual color graphic LED display board (Patent filed in 2008, Sri Lanka) – *Design is in production*

Publications in Peer Reviewed Journals

Graduate

1. Charan Surisetty, Pubudu Goonetilleke, Dipankar Roy and S.V. Babu, "**Dissolution Inhibition in Cu-CMP using Dodecyl-benzene-sulfonic Acid Surfactant with Oxalic Acid and Glycine as Complexing Agents**", Submitted to *Journal of The Electrochemical Society* (2008)
2. C. M. Pettit, P. C. Goonetilleke, G. M. Zenger, and D. Roy, "**Probing the Double Layer Capacitance of Carbon Nanotubes in an Ionic Liquid using Voltammetry and Impedance Spectroscopy**", Submitted to The Analyst (2008)
3. C.M. Sulyma, P.C. Goonetilleke and D. Roy, "**Analysis of current transients for voltage pulse-modulated surface processing: Application to anodic electro-dissolution of copper for electrochemical mechanical planarization**", *Journal of Materials Processing Technology*, In press (2008)
4. P.C. Goonetilleke and D. Roy, "**Relative roles of acetic acid, dodecyl sulfate and benzotriazole in chemical mechanical and electrochemical mechanical planarization of copper**", *Applied Surface Science* 254 (2008) 2696-2707
5. P.C. Goonetilleke and D. Roy, "**Voltage pulse-modulated electrochemical removal of copper surface layers using citric acid as a complexing agent**" *Materials Letters* 61**,** (2007) 380-383
6. C.M. Pettit, P.C. Goonetilleke, C.M. Sulyma and D. Roy, "**Combining impedance spectroscopy with cyclic voltammetry: Measurement and analysis of kinetic parameters for faradaic and nonfaradaic reactions on thin-film gold**", *Analytical Chemistry* 78 (2006) 3723-3729
7. C.M. Pettit, P.C. Goonetilleke and D.Roy, "**Measurement of differential capacitance for faradaic systems under potentiodynamic conditions: Considerations of Fourier transform and phase-selective techniques**" *Journal of Electroanalytical Chemistry* 589 (2006), 219-231
8. P.C. Goonetilleke and D. Roy, "**Electrochemical-Mechanical Planarization of Copper: Effects of Chemical Additives on Voltage Controlled Removal of Surface Layers in Electrolytes**", *Materials Chemistry and Physics* **94** (2005) 388-400
9. P.C. Goonetilleke, S.V. Babu, and D. Roy, "**Voltage-Induced Material Removal for Electrochemical Mechanical Planarization of Copper in Electrolytes Containing NO_3^-, Glycine, and H_2O_2**", *Electrochemical & Solid-State Letters* **8** (2005) G190-193

Undergraduate

1. "**Development of microcontroller based high capacity standalone data acquisition systems**", *B.W.S.P. Fernando, P.C. Goonetilleke, I.M.K. Fernando and D.U.J. Sonnadara.* SLAAS, Proc. 58th Annual Session, Sri Lanka, 2002
2. "**Microcontroller embedded web server with flash support**", *P.C. Goonetilleke, B.W.S.P.Fernando, I.M.K.Fernando and D.U.J.* Sonnadara. SLAAS, Proc. 58th Annual Session, Sri Lanka, 2002
3. "**Performance of parallel port based remote data acquisition systems in real-time data processing**", *P.C. Goonetilleke and D.U.J. Sonnadara*. IPSL, Proc. 18th Technical Sessions, Sri Lanka, 2002
4. "**Development of low cost network based virtual instruments**", *P.C. Goonetilleke and D.U.J. Sonnadara*, 57th Annual Sessions, SLAAS, E1:1223; (2001)-page 224
5. "**A low cost device protector for telephone interfaced equipment**", *P.C. Goonetilleke and D.U.J Sonnadara*, 57th Annual Sessions, SLAAS, C:135; (2001)-page 136
6. "**A low cost telephone-Interfaced equipment protector and a PC based low cost data acquisition system for Physics applications**", Department of Physics, University of Colombo, Dec. 2001. **[*Undergraduate Thesis*]**
7. "**A low cost DAQ system for Physics experiments**", *P.C. Goonetilleke*, 17th Technical Sessions, IPSL (2001)-page 17

Conference Papers, Seminars and Presentations

1. J. P. Zheng, D. J. Crain, P. C. Goonetilleke, and D. Roy,. "**Electrochemistry of Ruthenium in a Moderately Acidic Nitrate Solution: Considerations for CMP and ECMP**", Poster presented at the *13th International Symposium on Chemical Mechanical Planarization*, Lake Placid, NY, August 11-13, 2008
2. P. C. Goonetilleke, D. J. Crain, S. V. Babu and D. Roy, "**Voltage Pulse Modulated Electrochemical Removal of Ruthenium Surface Layers for Applications in ECMP**", Poster presented at the *13th International Symposium on Chemical Mechanical Planarization*, Lake Placid, NY, August 11-13, 2008
3. Surya Sekhar Moganty, Pubudu Goonetilleke, Ruth Baltus and Dipankar Roy, "**Electrochemical Characteristics of Ionic Liquid at the Porous Surface of a Paper Electrode of Multiwall Carbon Nanotubes**", *Conference paper submitted to American Institute of Chemical Engineers (AIChE) Annual Meeting*, 2008
4. Surya Sekhar Moganty, Joshua Close, Pubudu Goonetilleke, Sitaraman Krishnan, Ruth Baltus and Dipankar Roy, "**Electrochemical Supercapacitors Based on Polymerizable Ionic Liquids**",*Conference paper submitted to American Institute of Chemical Engineers (AIChE) Annual Meeting*, 2008
5. P.C. Goonetilleke, "**Electrochemical characterization of Li Ion Battery Materials**", Presentation at MetaMateria Partners, Columbus, OH, May 18, 2008
6. P.C. Goonetilleke, S. Sengupta,b T. Pyles, R. R. Revur, A. Tiruvannamalaib and D. Roy, "**Electrochemical studies of Nanomaterials for Advanced Lithium-Ion Batteries**", Poster presented at the *CAMP Technical Meeting*, Canandaigua, NY, May 15-17, 2008. – ***Awarded 2nd in place for the most creative poster***
7. P.C. Gonnetilleke, S. S. Moganty, R. E. Baltus and D. Roy, "**Electrochemical Characteristics of Hmim-Tf_2N Ionic Liquid at the Porous Surface of a Paper Electrode of Multiwall Carbon Nanotubes**", Poster presented at the *CAMP Technical Meeting*, Canandaigua, NY, May 15-17, 2008. – ***Awarded 1st in place for the most attractive poster***
8. Charan V. V. S. Surisetty**,** P.C. Goonetilleke**,** D. Roy[b], and S. V. Babu**, "Dissolution Inhibition in Cu-CMP using Dodecyl-benzene-sulfonic Acid Surfactant with Oxalic Acid and Glycine Complexing Agents",** Poster presented at the *CAMP Technical Meeting*, Canandaigua, NY, May 15-17, 2008
9. S. S. Moganty, P.C. Gonnetilleke, R. E. Baltus and D. Roy, "**Electrochemical Supercapacitors Based on Ionic Liquids**", Poster presented at the *CAMP Technical Meeting*, Canandaigua, NY, May 15-17, 2008
10. S.S. Moganty, R. E. Baltus, P.C. Goonetilleke and D. Roy, "**Physicochemical Characterization of Ionic Liquids**", Conference paper presented at the *American Institute of Chemical Engineers (AIChE) Annual Meeting*, Salt Lake City, Utah, Nov. 4-9, 2007
11. P.C. Goonetilleke, C. Sulyma, G. Zenger, S. Sengupta, T. Pyles, R. R. Revur, and D. Roy ' "**Electrochemical Characterization of Advanced Nanomaterials for Next Generation Lithium-Ion Batteries**", Poster presented at CAMP Technical Meeting, October 15-17, 2007, Potsdam, NY
12. P.C. Goonetilleke and D. Roy, "**Dodecyl Sulfate as a Corrosion Inhibitor and Acetic Acid as a Complexing Agent for Electrochemical Mechanical Planarization of Copper**", Poster presented at the *CAMP Technical Meeting*, Canandaigua, NY, May 16-18, 2007
13. P.C. Goonetilleke, D. Roy, "**Material Removal Efficiency of an Alkaline Electrolyte for ECMP of Ruthenium**", Poster presented at the *CAMP Technical Meeting*, Canandaigua, NY, May 16-18, 2007
14. C. M. Sulyma, P.C. Goonetilleke and D. Roy, "**Analysis of Current Transients for Voltage Modulated ECMP of Copper**", Poster presented at the CAMP Technical Meeting, Canandaigua, NY, May 16-18, 2007
15. P.C. Goonetilleke**, "Electrochemical Techniques for the Characterization of Advanced Materials for Next Generation Lithium-Ion Batteries",** Colloquium at Department of Physics, Clarkson University, NY, February 23, 2007
16. P.C. Goonetilleke and D. Roy, "**Material Removal for ECMP of Ruthenium**", Poster presented at *CAMP Technical Meeting, Potsdam, NY, October 18-20, 2006*
17. C.M. Sulyma, P.C. Goonetilleke and D. Roy, "**Analysis of Current Transients for Pulse-Modulated ECMP of Copper**", Poster presented at *CAMP Technical Meeting, Potsdam, NY, October 18-20, 2006*
18. C.M. Sulyma, P.C. Goonetilleke and D. Roy, "**Analysis of Current Transients for Voltage Pulse-Modulated Electrochemical Mechanical Planarization (ECMP) of Copper**", Poster presented at the *11th International Symposium on Chemical Mechanical Planarization*, Lake Placid, NY, August 13-16, 2006

19. P.C. Goonetilleke and D. Roy, "**Material Removal Efficiency of an Alkaline Electrolyte for Electrochemical-Mechanical Planarization (ECMP) of Ruthenium**", Poster presented at the *11th International Symposium on Chemical Mechanical Planarization*, Lake Placid, NY, August 13-16, 2006
20. P.C. Goonetilleke**, "Electrochemical and optical characterization of material interfaces for applications in planarization and sensor technologies",** Thesis proposal at Department of Physics, Clarkson University, NY, May 2, 2006
21. P.C. Goonetilleke, "**The Faradaic Efficiency of Material Removal in Voltage Pulse Modulated Electrochemical Mechanical Planarization of Copper",** Colloquium at Department of Physics, Clarkson University, NY, January 13, 2006
22. P.C. Goonetilleke and D. Roy, "**Examination of Dodecyl Sulphate as a Corrosion Inhibitor and Acetic Acid as a Complexing Agent for Electrochemical-Mechanical Planarization of Copper**", Poster presented at the *10th International Symposium on Chemical Mechanical Planarization*, Lake Placid, NY, August 14-17, 2005
23. P.C. Goonetilleke and D. Roy, "**Faradaic Efficiency of Glycine-Hydrogen Peroxide Solutions in Electrochemical-Mechanical Planarization (ECMP) of Cu**", Poster presented at the *10th International Symposium on Chemical Mechanical Planarization*, Lake Placid, NY, August 14-17, 2005
24. S.V. Babu, S. Pandija, Y. Hong, P.C. Goonetilleke, D. Roy, "**Complexing Agents and Surfactants in CMP and ECMP of Copper**", Conference presentation at the *10th International Symposium on Chemical Mechanical Planarization*, Lake Placid, NY, August 14-17, 2005
25. P.C. Goonetilleke, "**ECMP of Copper for Microchip Fabrication",** Colloquium at Department of Physics, Clarkson University, NY, February 4, 2005.

References

To be provided upon request.