

# JOEL C. THOMAS

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## SEMICONDUCTOR PROCESS/ MODELING ENGINEER

Skilled with both good theoretical knowledge and research experience on various semiconductor fabrication process technology, material characterization, modeling and simulation. Over 4 years of experience with statistical data analysis. Excellent written and verbal communication skills and extensive experience in technical documentation.

### Instrumental Proficiency

- Electrochemical Methods (Electropolishing, Electroplating, Linear Sweep Voltammetry)
- SEM (Scanning Electron Microscope) with NPGS and E-Beam Lithography Tool
- SEM with FIB (Focused Ion Beam) and EDS (Energy Dispersive X-ray Spectroscopy)
- AFM (Atomic Force Microscope)
- Sputtering System,
- Thermal evaporation
- E-beam evaporation
- Resist Spin Coater
- Wet Etching
- Ellipsometer
- Alpha Step Profilometer
- Potentiostat/ Galvanostat with Rotating Disk Electrode (RDE)
- Semitool ECD Raider

### Application Software/ Programming

- Matlab, COMSOL
- NPGS (Nanometer Pattern Generation System)
- DesignCAD LT
- Microcal Origin, Mathcad
- C, C++, Verilog, VHDL
- Pspice, CALP
- MS Office, MS Visio
- DB2, SQL, SAS, and SPSS
- SILOS, Quartus
- COBOL, JAVA, and PHP

### Professional and Research Experience

**RESEARCH ASSISTANT**, Electrochemical Nanofabrication and Nanomaterials Synthesis Laboratory, University of Houston, Texas, June 2008 – Present

*Research lab at UH dedicated towards electrochemical processes in semiconductor fabrication.*

- Research aimed to enhance the understanding of planarization of copper interconnects during fabrication using electropolishing which will work alongside of CMP.
- Modeled Cu Surface Morphology Evolution during Electropolishing and its simulation by image analysis in Matlab.
- Created a toolbox script in Matlab with complete UI handling Fourier analysis of image processing and other parameters.
- Expertise in Planarization and Electroplating of Copper using novel electrochemical techniques for micro and nanofabrication.
- Designed and printed sub-micron and nm features using e-beam lithography on Silicon wafers.
- Deposited 10 to 100 nm thin films of Ti, Ta, Au, etc. using PVD
- Surface morphology analysis using SEM, AFM etc.
- Setup new fab tools: Semitool ECD Raider M.
- Worked in Class 10 and Class 100 clean room facility.

**STATISTICAL ANALYST**, Measurement and Evaluation Center, University of Houston, Texas, Jan. 2008–Dec. 2008

*University initiative to offer consulting on data collection and data analysis for research, surveys and exam scores.*

- Performed statistical analysis on research data and surveys conducted at UH using statistical software (SPSS and Excel VB).
- Delivered clear and concise documentation on all data analysis.
- Chi-square tests, reliability tests, factor analysis, regression analysis, etc.

**SOFTWARE ENGINEER/BUSINESS ANALYST**, Infosys Technologies Ltd., Bangalore, India, Nov. 2005–July 2007

*Leading global provider of business and technology consulting, and software solutions. Over 100,000 employees worldwide.*

- Software application development, maintenance and testing at CMMI level 5 for a fortune 500 client.
- Business requirement analysis and data analysis using DB2, SQL and SAS.
- Coordinated and worked on projects with clients from various locations across time zones.

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## Operating System/Assembly Language

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- Unix, Linux
- Windows
- Mainframe OS/390, z/OS
- INTEL 8085/8086 Microprocessor
- PIC Microcontroller

## Relevant Coursework

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- Nanoscale Design & Fabrication
- MEMS & Nanodevices
- Microlithography
- Material Science of Thin Films
- VLSI Design
- Solar Cells Design & Fabrication
- Advanced Hardware Design
- Advanced Digital Design
- Stochastic Processes

## Education

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Master of Science, Electrical Engineering– GPA: 3.5/4  
University of Houston  
Houston, TX – Spring 2010

Bachelor of Engineering,  
Electrical and Electronics  
Engineering– GPA: 8.2/10  
Sathyabama Institute of  
Science and Technology,  
Chennai, India – May 2005

Defending my master's thesis in January 2010 and available for internship of full-time from February 2010.

## Publications and Conferences

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- Symposium Presentation on “*Modeling of Copper Surface Morphology Evolution during Electropolishing*”, **Joel C. Thomas** and Stanko R. Brankovic at 38th Semi-annual TcSUH Student Symposium, Houston, TX Dec. 2009.
- Symposium Paper and Presentation on “*Modeling of Copper Surface Morphology Evolution during Electropolishing*”, **Joel C. Thomas** and Stanko R. Brankovic at First International Symposium on Nanotechnology, Energy and Space, Houston, TX Oct. 2009.
- Conference Paper and Poster Presentation on “*Modeling of Cu Surface Morphology Evolution during Electropolishing*”, **Joel C. Thomas** and Stanko R. Brankovic at Graduate Research Conference, Houston, TX May 2009.

## Research and Academic Projects

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- **Master's Thesis:** Modeling of Copper Surface Morphology during Electropolishing.  
**Thesis Committee:** Dr. Stanko R. Brankovic (Advisor & Chair), Dr. Dmitri Litvinov, Dr. Francisco Robles-Hernandez.
- Modeling of Electron Beam Lithography system for multi-pass and gray scale imaging using MATLAB.
- Modeling of Optical Lithography system using MATLAB to study the relation between pitch, exposure, and feature size.
- Modeling and simulation of one of the legs of silicon microrobot on COMSOL Multiphysics for MEMS.
- Design and simulation of “4 bit NAND Full Adder” using CALP and PSPICE.
- Design, simulation and demonstration of “Numerical Score Prediction Game System” with DE2 board, Keypad, 7-segment display and triggers using SILOS and QUARTUS.
- Development of a model with Micro-controller for “GPS Based Collision Mitigation and Vehicle Guidance”.

## Achievements and Other Activities

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- Recipient of Academic Competitive Scholarship Award at University of Houston.
- Certified in General Laboratory Safety and Hazardous Materials Orientation.
- Member of IEEE (Institute of Electrical and Electronics Engineers), UH Nanofabrication Facility, Texas Center for Super Conductivity (TcSUH), Phi Beta Delta Honor Society, Houston Bridges( an association to help International Students).
- Editor and author of “How-to-do tips on Computer and Office applications” at [www.lytebyte.com](http://www.lytebyte.com)
- Media Equipment Coordinator at City of Refuge Church, Houston.