



5th TSMC Outstanding Student Research Award Call for Applications

The purpose of the TSMC Outstanding Student Research Award is to recognize exceptional semiconductor-related researches carried out by graduate students. This is the fifth competition of the Award of which experimental or first-principle researches oriented to technology advancement as well as fundamental understandings are welcome.

General areas of interest are in four categories as followings:

Category I: Circuit Design Technologies

This category covers the broad scope of circuit design, including digital, analog, RF, and 3D IC. Specific areas for reference are:

- Theory and / or modeling of circuit architectures
- Design and characteristics of novel architectures
- Design for manufacturing
- Device and Circuit co-optimization techniques for power and performance management
- High precision and high performance device and circuit design architectures
- Design Automation

Category II: Electronic Device, Process and Patterning Technologies

This category includes a wide range of electronic device structures, including Si CMOS, TSV, sensors, memory technologies, TCAD, and MEMS. Also accepted are processing techniques for the manufacturing of electronic devices. Specific areas for reference are:

- Nano-scale Si devices and device physics understanding
- Novel solid state and nano-electronic devices, including organic electronics and bio-electronics
- Reliability physics of devices and interconnects
- Novel processes in the areas of thin-film deposition / growth, etching, diffusion and lithography
- Theory and / or modeling of lithographic imaging
- Silicon-in-Package (including 3D IC, TSV) and associated processing technologies
- Impact of processing on device physical and electrical characteristics
- Process optimization for improved device performance (yield, reliability, manufacturability)

Category III: Physics and Chemistry of Electronic Materials

This category covers the whole range of materials used in the manufacture of nano-scale electronics devices. Specific areas for reference are:

- New materials for electronic applications

- Novel materials characterization techniques
- Characterization techniques for nano-scale devices and materials
- Theory and or modeling of materials properties
- Impact of materials properties on device characteristics (yield, reliability, manufacturability)

Category IV: Green Electronics

This category covers the broad scope of electronics in relation to solar CIGS and lightening energy. Specific areas for reference are:

- Novel device structures
- New device and package materials and associated process techniques
- Physical, chemical, optical and electrical characterization techniques for materials, devices and packages
- Device physics understanding and modeling of electrical, optical performance
- Reliability physics of materials, devices and packages, and reliability assurance methods

Eligibility

Researches in relevance to the areas of interest carried out in the 2010 and 2011 academic year are eligible for the competition of the 5th TSMC Outstanding Student Research Award. In the meanwhile, the applicant must hold a full-time student identity at the time he/she submits the application (graduated in 2010 or before is not eligible).

Applications

Applications must be submitted electronically (on Microsoft WORD) to Andrew Chiang (contact person) at chiangkr@tsmc.com before midnight of July 20, 2011 in your time zone. Prior to preparing your submission, please read the following guidelines carefully. You may download the Application form on www.TSMC.com.

- Maximum 3-page extended abstract (1 page text, 2 pages figures, drawings) together with application form (page 5-7 in this announcement), indicating the purpose of the research, the manner and degree to which this research advances the field, and the significance of the specific results found in the research. The materials will be used for preliminary review by the review panel.
- Advance registration (optional): it is accepted that you email your research title, the category you intend to compete in, personal information (name, university, major, email, phone, advisor's name) to acquire a registration number before your formal submission. Please fill in your registration number, if applicable, in the application form.
- Applications must be accompanied by recommendations from the applicant's research advisor. The recommendations shall highlight the significance of the research itself rather than the author's personal merits.
- Applicant's published papers related to the research could be attached as supporting materials (max. 1 published papers attached).

- Applicant who enters into the final competition must submit the slides 7 days prior to the presentation.
- All written applications, supporting materials, and oral presentation must be in English. The applications and recommendations must be on Microsoft Word; the slides for final competition on Microsoft PowerPoint.
- To avoid the author's publication conflict, submissions will be only used for award competition and be kept confidentially.

Review

Award Committee

The Award Committee administers the awards. Recipients of the Award are selected by an independent selection panel of technology leaders, including TSMC Fellow, Academician, invited IEEE Fellow and prominent faculty members in the domain of each category. This year, the core members of the Award Committee are:

- **Dr. Burn Lin**, Chairman of this Award Committee. He is the Vice President of R&D, TSMC, a member of the US National Academy of Engineering, Distinguished Fellow of the TSMC Academy, Fellows of IEEE and SPIE. He is the editor-in-chief of the Journal of Nano/Microlithography, MEMS, and MOEMS. Dr. Lin was awarded 2 TSMC Innovation Awards, 10 IBM Invention Awards, the IBM Outstanding Technical Contribution Award, the SPIE Frits Zernike Award, the IEEE Cleo Brunetti Award and the OSU Benjamin G. Lamme Medal.
- **Dr. Fu-lung Hsueh** is the director of Design Technology Division at TSMC, and is a Fellow of the TSMC Academy. Prior to joining TSMC in 2003, he worked at Sarnoff Corporation (former RCA Research Center) in Princeton, New Jersey for 22 years. His major technical experiences include mixed-signal circuits, flat-panel display, and CMOS/CCD image sensor designs. He received 5 outstanding technical achievement awards at Sarnoff, and 3 TSMC Innovation Awards.
- **Dr. Anthony Oates** is the director of Technology Reliability Physics Research at TSMC, and is a Fellow of the TSMC Academy. He is currently the editor-in-chief of the IEEE Transactions on Device and Materials Reliability, and a past general chair of the IEEE International Reliability Physics Symposium.
- **Dr. Jacob C.L. Tarn** is currently leading TSMC Solid State Lighting Company. Prior to joining TSMC, he was the founder, board of director and chief executive officer of GigaComm Corporation. During 1996 and 2001, he co-founded Epistar Corporation and served as vice-president and board of director. Dr. Tarn has over 20 years R&D and management experiences in LED and III-V compound related industry. He has also 15 international patent portfolio and over 100 publications in leading journals. Dr. Tarn received his Ph.D degree in Materials Science and Engineering from North Carolina State University in 1988.
- **Dr. Justin Wang** is director of New Business-Solar at TSMC. He has served in various marketing and sales position at TSMC for 15 years prior to joining New Business organization. Dr. Wang received MS, MA, and PhD degrees from Princeton University.

Selection Criteria

- **Technical Depth:** The research presents or supports a finding or conclusion with significant potential value to the target audience.
- **Innovation:** Contribution of significant new information or insights.
- **Technical and Logical Validity:** The strength and intellectual quality of the idea, supporting rationale, and the soundness of the thought processes in reaching conclusions.
- **Accuracy:** Accuracy of research results as well as the specific language used to capture an idea or concept precisely and accurately in respective technical field. Vague or undefined terms should be avoided.
- **Simplicity:** The degree an idea is conveyed quickly and clearly.

Preliminary Review

- The Review Panel will rate abstracts in each category according to the selection criteria.
- Up to 6 contestants in each category will be selected into the final competition, and they will be informed individually of the date and venue of the oral presentation.
- At the Review Panel's discretion, the judges hold the right to move the applicant's submission to other category for better fit.

Final Competition

The contestant in final round is required to make a 15-minute presentation to the Review Panel, followed by a 10-minute question-and-answer session.

Schedule

- Applications close: July 20, 2011 (late submission will be disqualified)
- Final Competition: Oct. 4, 5, 2011
- Award Ceremony: Oct. 7, 2011 (Fri)

Awards

- Top 3 winners of the final contestants of each category will be awarded with
 - Gold Prize: Medal and cash prize USD 6,000 (before tax)
 - Silver Prize: Medal and cash prize USD 4,000 (before tax)
 - Bronze Prize: Medal and cash prize USD 2,000 (before tax)
- Commendation: other contestants in final competition will be honored with certificate and cash prize USD 500 each (before tax).
- Overseas winners will be provided with complimentary round-trip flight (the nearest airport from the university enrolled / Taiwan Taoyuan International Airport) to the award ceremony to be held in TSMC's headquarters in Taiwan, as well as up to 4 nights hotel accommodation.