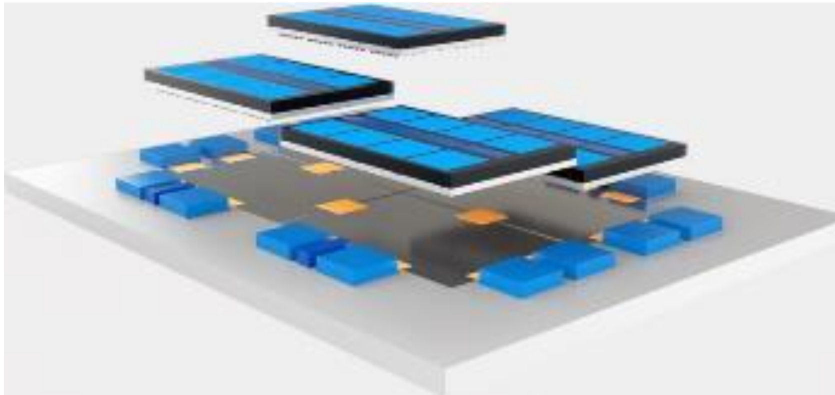
Because the future can't wait, we bring the best minds together to achieve the unimaginable

Packaging (PKG) e-Kickoff



March 23 and 29-31, 2022

Virtual

John Oakley, Science Director

Tameka Bell & Mary Nichols, Research Program Coordinator

https://www.src.org/program/grc/pkg/
https://www.src.org/calendar/e007526/
https://www.src.org/calendar/e007527/

SRC Select Disclosure

Thank you!

On Behalf of the SRC,

Thank You!

To all the industry members for their sponsorship and mentorship

To all the Principal Investigators & their Students

To Tameka Bell and Mary Nichols at SRC for the logistical support

To all of you for being online with us!

Reminder: Invoicing and Deliverables

Regular invoicing

Invoice on regular basis: monthly is preferred

Excess money (calendar year) is considered profit and taxable!

Spending must occur within contract period

Invoicing expected to be at or above 95% invoiced at end of each contract period

Final invoice within 60 days after project ends

Submit deliverables on time: even 1 day is too late!

System will flag delinquencies

Late deliverables will stop invoices being paid and can jeopardize future funding

Contact SRC if there are issues with getting deliverables on time

Pre-publication drafts must be deposited at SRC > 60 days before published

Best practice: deposit draft to SRC website when submitting to journal/conference (also thesis)

Update the draft on the SRC website with final paper after acceptance (select submit a new version)

Acknowledgement of SRC funding must be added to all publications

New SRC Student Platform on LinkedIn (Beta)

https://www.src.org/student-center/handbook/linkedin/

Join the Beta Now!

- SRC Student Programs is rebranding to **"SRC Research Scholars" Program**

- What is the **SRC Research Scholars Program**?
  - SRC provides undergrads, graduate students, and postdoctoral researchers with a unique education consisting of traditional course work, cutting-edge research, and direct interaction with the semiconductor industry
  - These Research Scholars work on industry-relevant research with SRC-funded faculty who are recognized experts in their fields
  - Through our extensive community of academics and industry personnel, we nurture the evaluation of the talent pipeline for our industry and beyond
  - Our alumni have become industry leaders and renowned faculty researchers, creating a virtuous cycle where mojo begets mojo

SRC encourages all undergrads, graduate students, and postdoctoral researchers to join this Beta program!!!

Get LinkedIn with SRC

SRC uses a special LinkedIn Affiliate page for the SRC Research Scholars Program. Undergrad, graduate students, and postdoctoral researchers participating on SRC research add their SRC Research Scholars experience to their LinkedIn profile. This allows Scholars a way to professionally showcase their talent and experience. It also simplifies how recruiters, engineers, and even other Scholars can find SRC Research Scholars, using either the LinkedIn Search* or LinkedIn Recruiter*.

SRC Research Scholars Program*

By being part of our community, Research Scholars will have a unique opportunity to get to know professionals with careers in the semiconductor industry or government, top researchers in their fields, and other students with similar interests.

Intellectual Property Statement

https://www.src.org/about/contracts-ip/#ip

The information provided by researchers during this annual review

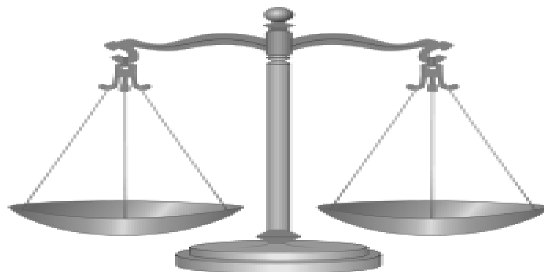
- Is the property of the university and of the researchers presenting this information
- May include research results sponsored by and provided to the funding members
- May include intellectual property rights belonging to the university and SRC, to which sponsors may have license rights

By attending or viewing this review, you are agreeing

- Not to use this information for purposes unrelated to the review unless and until approved by SRC
- To keep this information in confidence until the university and SRC have evaluated and secured any applicable intellectual property rights

After any intellectual property rights have been secured, the SRC encourages the University and researchers to publish and freely disseminate this information and results of the sponsored research program.

- Worldwide patent rights are waived if publication or public dissemination occurs prior to filing a corresponding U.S. provisional or utility patent application



General Data Protection Regulation

https://www.src.org/app/account/guide/privacy-policy/

- Applies to SRC
- Personal data regulations
- Involves privacy notices, consent, and security
- SRC Privacy Policy

E-Kickoff Agenda, Day 1

- March 23, 2022 @ 8:00-9:30pm ET (virtual)
  - 5 new projects to e-kickoff
  - 10-min presentations + 5 min Q&A

https://www.src.org/calendar/e007527/

Virtual Event
All Times in ET

Wednesday, March 23, 2022		
Time	Title	Presenter
8:00 - 8:05 pm	Welcome & Introduction	John Oakley / SRC
8:05 - 8:20 pm	Task 2878.017:In Situ Studies on Thermal Compression Bonding of Nanotwinned Cu with Passivation Layers	Prof. Xinghang Zhang / Purdue University
8:20 - 8:35 pm	Task 2878.018:Printed Conformal Metal Films for Electromagnetic Interference (EMI) Protection	Prof. Paul Chiarot / Binghamton University
8:35 - 8:50 pm	Task 2878.019:High Thermal Interface Conductance Metrology	Prof. Amy Marconnet / Purdue University
8:50 - 9:00 pm	Break	
9:00 - 9:15 pm	Task 2878.020: Intra-Die Cooling of Monolithic 3D Stacks using Oscillating Heat Pipe Spreaders	Prof. Liang Pan / Purdue University
9:15 - 9:30 pm	Task 2878.021:Microalloying for Stable Low Temperature Solder Microstructures and Reliable Heterogeneous Integration	Prof. Carol Handwerker / Purdue University

E-Kickoff Agenda, Day 2

- March 29, 2022 @ 8:00-9:30pm ET (virtual)
  - 2 projects to review
  - 25-min presentations + 5 min Q&A
  - Industry-only caucus at end

https://www.src.org/calendar/e007526/

Virtual Event
All Times in ET

Tuesday, March 29, 2022		
Time	Title	Presenter
8:00 - 8:05 pm	Welcome & Introduction	John Oakley / SRC
8:05 - 8:35 pm	Task 2976.001:Predictive Methodology to Assess Reliability Life Capability of Solder Interconnects	Prof. Ganesh Subbarayan / Purdue
8:35 - 9:05 pm	Task 3044.001: 3D Temperature Mapping of Stacked Dies	Prof. Prof. David Cahill / UIUC
9:05 - 9:30 pm	Industry Caucus (closed meeting)	

E-Kickoff Agenda, Day 3

- March 30, 2022 @ 8:00-9:30pm ET (virtual)
  - 6 new projects to e-kickoff
  - 10-min presentations + 5 min Q&A

https://www.src.org/calendar/e007526/

Virtual Event
All Times in ET

Wednesday, March 30, 2022		
Time	Title	Presenter
8:00 - 8:05 pm	Welcome & Introduction	John Oakley / SRC
8:05 - 8:20 pm	Task 2810.080: Efficient and High-Density Fully In-Package GaN-Based High-Ratio DC-DC Converters	Prof. Cheng Huang / Iowa State
8:20 - 8:35 pm	Task 3071.001: Innovation of Warpage Prediction for Transfer Molding and Compression Molding Processes	Prof. Bongtae Han / Univ. of Maryland/College Park
8:35 - 8:50 pm	Task 3072.001:PMIP: Power-Magnetics-in-Package Technology for Ultra-Compact Vertical 48V-1V CPU Voltage Regulators	Prof. Minjie Chen / Princeton University
8:50 - 9:05 pm	Task 3073.001: Integrated Chiplet-Encapsulation for 3D Heterogeneous Integration	Prof. Muhannad Bakir / Georgia Tech
9:05 - 9:20 pm	Task 3074.001: High Performance Copper-Epoxy Interfaces for High Frequency Inter-die and Off-package Signal Transmission	Prof. John Flake / Louisiana State
9:20 - 9:35 pm	Task 3075.001: Advanced Characterization Techniques for Investigating Failure Mechanism of Silicon and Package Interconnects	Prof. Choong-Un Kim / UT Arlington
9:35 - 9:50 pm	Task 3070:001: 2.5D Integrated GaN Voltage Regulator (VR) with Embedded Magnetics	Fang Luo / Stony Brook

E-Kickoff Agenda, Day 4

- March 31, 2022
  @ 8:00-9:30pm ET (virtual)
  - 6 new projects to e-kickoff
  - 10-min presentations
    + 5 min Q&A

https://www.src.org/calendar/e007526/

Virtual Event
All Times in ET

Thursday, March 31, 2022		
Time	Title	Presenter
8:00 - 8:05 pm	Welcome & Introduction	John Oakley / SRC
8:05 - 8:20 pm	Task 3076.001: A Novel RDL Interposer Fabrication by Low Temperature Hybrid Bonding Method	Prof. Kuan-Neng Chen / National Chiao Tung University
8:20 - 8:35 pm	Task 3077.001: Predictive-Models and Characterization-Data for Package-Interfaces under Sustained High-Temperature High-Humidity Operation in Automotive Underhood Environments	Prof. Pradeep Lall / Auburn University
8:35 - 8:50 pm	Task 3078.001: Tunable Low-cost Passivation Coating for Facilitating Copper Wafer-level Bonding	Prof. Oliver Chyan / Univ. of North Texas
8:50 - 9:05 pm	Task 3079.001: Characterization of Interfacial Adhesion under Cyclic Loading	Prof. Rui Huang / UT Austin
9:05 - 9:20 pm	Task 3080.001: Low-temperature Cu-Cu Hybrid Bonding for Die-to-Wafer Application	Prof. Chih Chen / National Chiao Tung University
9:20 - 9:35 pm	Task 3081.001: 2.5D Polymer-based Interposer Technology for the Heterogeneous Integration of 6G Wireless Communication Systems	Prof. Yu-Ting Cheng / National Yang Ming Chiao Tung University

Thank You!

John Oakley
Science Director
John.Oakley@src.org

Packaging Research Program

“Create and explore advanced evolutionary and revolutionary packaging technologies for reliably encapsulating and efficiently integrating microsystems”

John Oakley, Science Director

PKG

The application drivers for Packaging technologies have evolved significantly as computing devices continue to evolve along a few emerging market vectors:

- Small, flexible, light, easy-to-use interconnected consumer devices
- Cloud based computing (high compute density in data centers and servers)
- Embedded computing offering greater degree of control (automotive, commercial, space)
- Green, high performance in ergonomic and small form factor mobile applications (IoT)

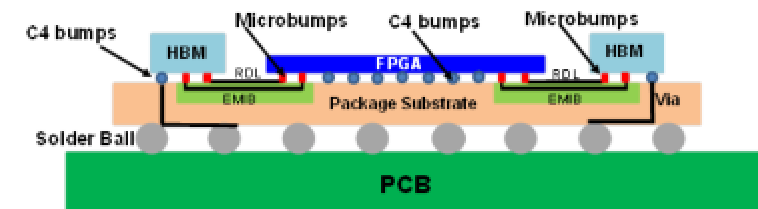
(https://www.src.org/program/grc/pkg/)

Current Research focused on:

- Design Enablement and Tools
- Interconnects, including optical
- Metrology, modeling, and test including reliability and electro migration
- Power delivery and thermal management
- Materials including solder and wire-bonds

Future Research Directions

- New Research focus areas will include:
  - Heterogeneous Integration (HI) is a Product Differentiator
  - Packaging for automotive and extreme environments
  - Flexible packages
  - Advanced Sensor Packaging
- **Additionally SRC is partnering in road-mapping efforts for HI (IEEE HIR)**



Resources that Help Academics Evaluate, Adopt, and Amplify Emerging Member Solutions

Member Resources

- SRC has collected information members provide for the academic community, including education, design, and prototyping
- SRC researchers and students are encouraged to take advantage of these resources in their research and education activities
- Link to the resources:
  https://www.src.org/program/grc/guide/researcher/guidelines/

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Participating Universities
Education Alliance

4819 Emperor Blvd, Suite 300 Durham, NC 27703

Voice: (919) 941-9400 Fax: (919) 941-9450

Member Resources

SRC has collected information members provide for the academic community, including education, design, and prototyping. SRC researchers and students are encouraged to take advantage of these resources in their research and education activities

Intel

- Intel Open Data Center Diagnostic Project
- Intel Academic Compute Resource Environment (ACE)
- Intel Academic Program for oneAPI

Analog Devices

- Active Learning Program
- ADALM-SR1 Hardware
- ADALM-SR1 Switching Regulator Active Learning Module

ARM

ARM Academic Access
ARM Education

- ARM University Program Education Kits
- ARM Education Online Courses
- ARM Education Textbooks and Reference Books

Texas Instruments
Specific tutorial and curriculum for universities include:

- Texas Instruments University Program
- TI Robotics System Learning Kit
- TI Power Management Lab Kit
- TI Experimental Power Electronics Reference and Curriculum
- TI Precision Labs

IBM

- IBM tutorial and curriculum for universities
- IBM Skills Academy
- IBM + Coursera
- IBM PhD Fellowship Program
- IBM Quantum Computing - student opportunities
- IBM AI Hardware

NXP

- Rapid IoT Prototyping Kit

Siemens

- EDA Academic Products

Qualcomm

- University Relations Program

SRC Research Scholars Program (Beta)

https://www.linkedin.com/company/src-research-scholars/

HOW TO ADD SRC RESEARCH SCHOLAR EXPERIENCE

In the Experience section, click the plus icon to add experience. (If you don't already have an experience section, you will need to add one.)

- Enter **Research Scholar** as your Title.
- Select **SRC Research Scholars Program** as your Company.
- You will also need to add a Start Date for when you began working on SRC research.

Experience ①

Add experience

Title * ②

Research Scholar

Employment type

-

Country-specific employment types

Learn more

Company * ③

SRC Research Scholars Program

In the Description field, you can add the following information of your choosing:

- Thesis title
- Area of research interest
- Brief project description
- SRC Research Program and task title (e.g., GRC Hardware Security "Task Title")

Keep in mind that the description field is searchable by hiring managers so make this content count!

Search | Home | My Network | Jobs | Messaging

Connect | Message | More...

Yi Ram Kim · 2nd

Research Scholar at SRC Research Scholars Program | PhD at Materials Science & Engineering at UT Arlington

Euless, Texas, United States · 192 connections · Contact info

SRC Research Scholars Program

The University of Texas at Arlington

Experience

Research Scholar
SRC Research Scholars Program
Nov 2017 – Present · 3 yrs 7 mos

•Dissertation Title
"The Effects of SnAgCu Solder Interconnect Package's Parameters on Electromigration Failure Mechanisms"

•Area of Research Interest
Reliability, Microelectronic Packages, Electromigration, SAC Solder Interconnect, Failure Analysis

•Project Description ...see more

The University of Texas at Arlington
4 yrs 10 mos

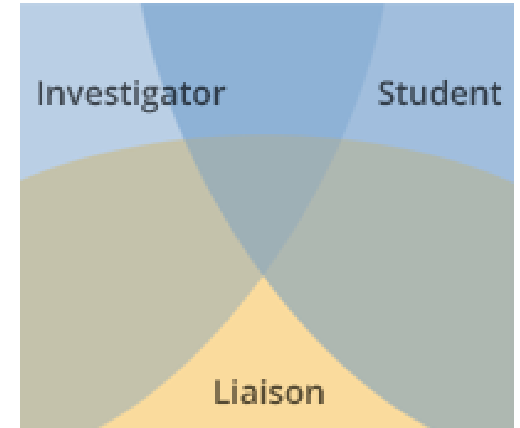
Graduate Research Assistant
Aug 2016 – Present · 4 yrs 10 mos

SRC Liaison Program

Maximizing the Value of Participation

Move Yourself, Your Company and the Next Generation Forward

Expectation to have regular PI-Liaisons calls at least one every 4-8 weeks



Develop the Workforce

- Provide relevant guidance for industry challenges
- Prepare students to enter industry or pursue future academics

Contribute to Research

- Encourage technology exchange between university and industry
- Bridge the conventional gap between academia and industry

Academia Contributes to Industry

- Provide an out of the box approach to current problems which enhance industry research and development enables a differentiated product for the marketplace
- Provide an outside perspective adding diversity to the thought process of how best to attack a challenge

Access New Technology

- Gain valuable insights into problems and solutions that will ultimately impact industry competitiveness
- Provide an effective way to deliver actionable research results directly into their companies

Identify the Best

- Identify the most compelling research from current and recent research

https://www.src.org/liaison/

Effective collaboration begins with communication

SRC Program Manager

- Runs Advisory Board and aligns research
- Educates PI about requirements and responsibilities
- Encourages Liaison participation
- Finds opportunities for further engagement

University PI

- Pursues ambitious, ground-breaking research
- Schedules regular calls, every 4-8 weeks
- Arranges meet-ups at conferences
- Presents research at annual reviews

Student

- Leads meetings
- Presents findings
- Aims to present at TECHCON
- Is knowledgeable about SRC members

Liaison

- Provides industry perspective to PI
- Transfers technology into company
- Advocates for SRC research
- Coordinates with Advisory Board

Academics solving meaningful problems

Increase of tech transfer

Clear investment ROI