UIDPCONNECT
2021

Semiconductor R&D and Global Priorities

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UIDP
Strengthening University-Industry Partnerships

Semiconductor Research Corporation

The R&D Mosaic: Government, Industry, Academia, and National Labs

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Premier Microelectronics Consortium Since 1982

Private Sector and Interagency, Participation and Governance

DARPA NSF NIST

AMD ANALOG DEVICES arm EMD PERFORMANCE MATERIALS

GlobalFoundries IBM intel LOCKHEED MARTIN

MEDIATEK Micron MUBADALA NORTHROP GRUMMAN NXP

QUALCOMM Raytheon Technologies SAMSUNG SIEMENS

SK hynix TEL Texas Instruments tsmc Veeco

SRC is a trusted advisor with a vast network, community, and shared dedication to research, prototyping, and workforce training in advanced semiconductor technologies

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Nov' 20 Newly-Announced $3.4 Billion Plan Aims to Stimulate US Semiconductor R&D

https://www.allaboutcircuits.com/news/newly-announced-3point4-billion-plan-aims-stimulate-us-semiconductor-rd/

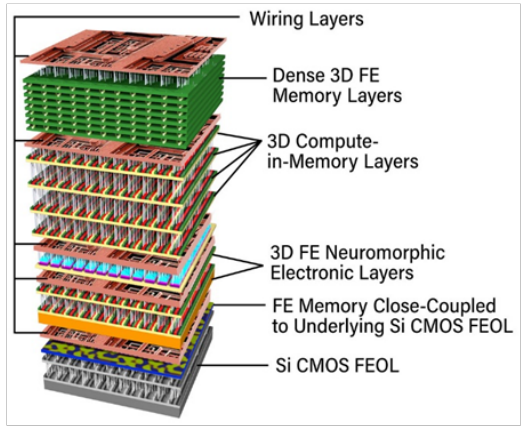
https://www.src.org/about/decadal-plan/

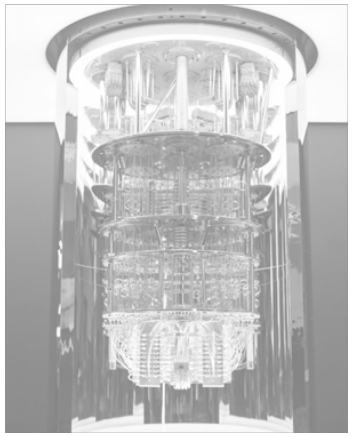
Five "Seismic Shift" Research Priorities

- Smart Sensing — **The Analog Data Deluge**
- Memory & Storage — **The Growth of Memory and Storage Demands**
- Communication — **Communication Capacity vs. Data Generation**
- Security — **ICT Security Challenges**
- Energy Efficiency — **Compute Energy vs. Global Energy Production**

Microelectronics & Advanced Packaging Technologies (MAPT)

We must evaluate market-driven opportunities "side-by-side" to realize lasting innovations





Priority 1

2.5D and 3D Advanced Packaging

Image: DARPA/Intel
https://www.darpa.mil/program/common-heterogeneous-integration-and-ip-reuse-strategies

Priority 2

3D Super Chips

Image: SIRO, Penn State, Prof. Vijay Narayanan
https://news.psu.edu/story/625834/2020/07/15/research/over-10-million-awarded-penn-state-energy-center

Priority 3

Hardware for New Paradigms

Image: IBM Q system displayed at CES 2020
https://www.fierceelectronics.com/electronics/what-quantum-computing

It is great to see that "hardware is back!," but we must invest strategically to meet the needs and create opportunity for the entire semiconductor ecosystem in the coming decades.

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Future Talent

Drive holistic, optimal solutions in HW/SW through interlocked multidisciplinary research

Help students see we have hard yet interesting problems that can't be solved without them

Convey to students that opportunities are abound for the next 20-30 years

Create industrial relationships and internship experiences that provide insight into SOTA*

*SOTA = State of the Art

We need an aspirational new narrative that ignites the next generation of talent

Call to Action

- The ICT opportunities of tomorrow are **unachievable with emerging hardware technologies** as the underlying hardware is up against fundamental physical limits.
- A crisis is at hand, where the current hardware paradigm must shift to create the desired value with **microelectronic and advanced packaging technologies (MAPT) as the key driver**.
- To stay at the leading edge of hardware innovation, we must invest in early-stage ideas and tech maturation, exploring critical options **through a fast-fail and tech-transfer mindset**.
- It is equally important that we are **committed to workforce development and broadening participation**. There is a bright future for semiconductors, but we must change our narrative to win over the hearts and minds of next gen innovators.

The greatest risk is not investing in semiconductor R&D for our future.

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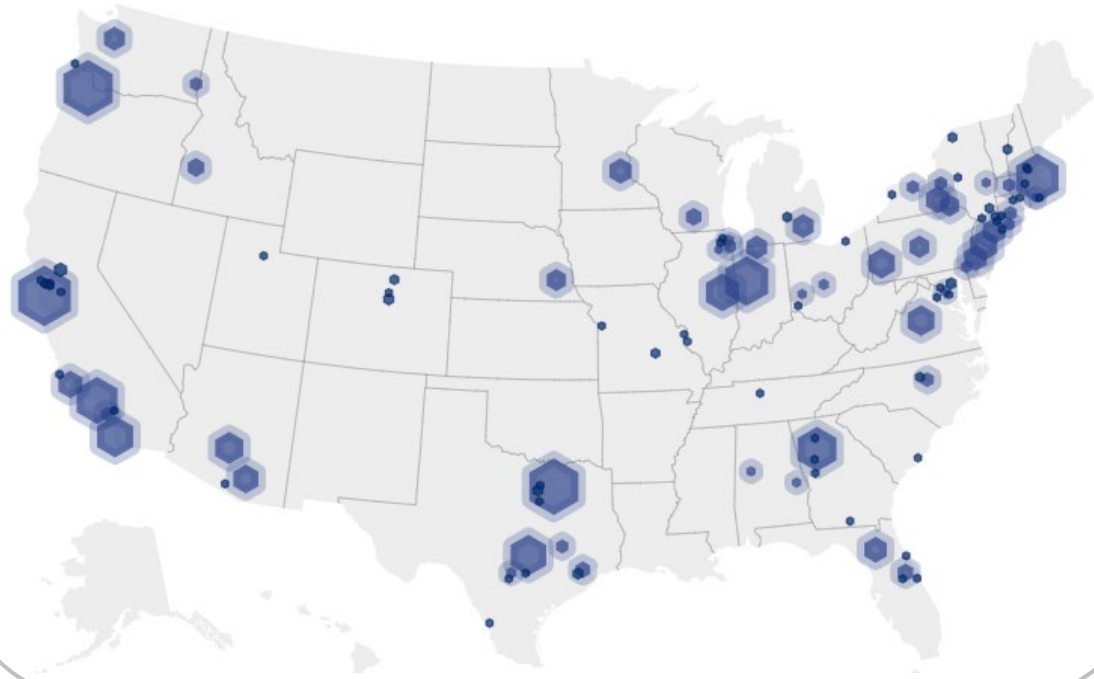
Because the future can't wait, we bring the best minds together to achieve the unimaginable

A Network for US-Led Microelectronics Leadership

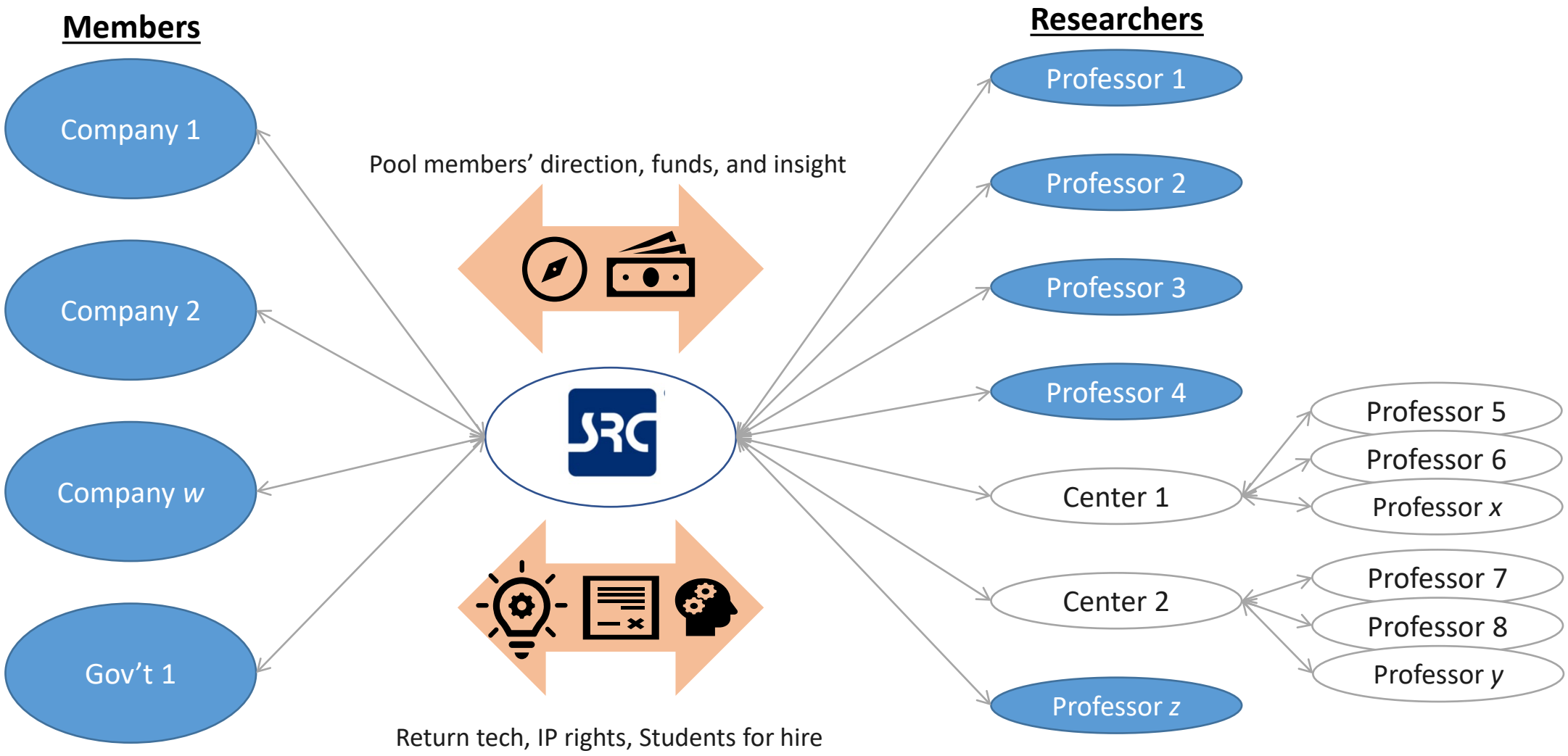
SRC Currently Funds Research at >90 U.S. Universities

>2700 U.S. SRC Researchers in a Public-Private Partnership



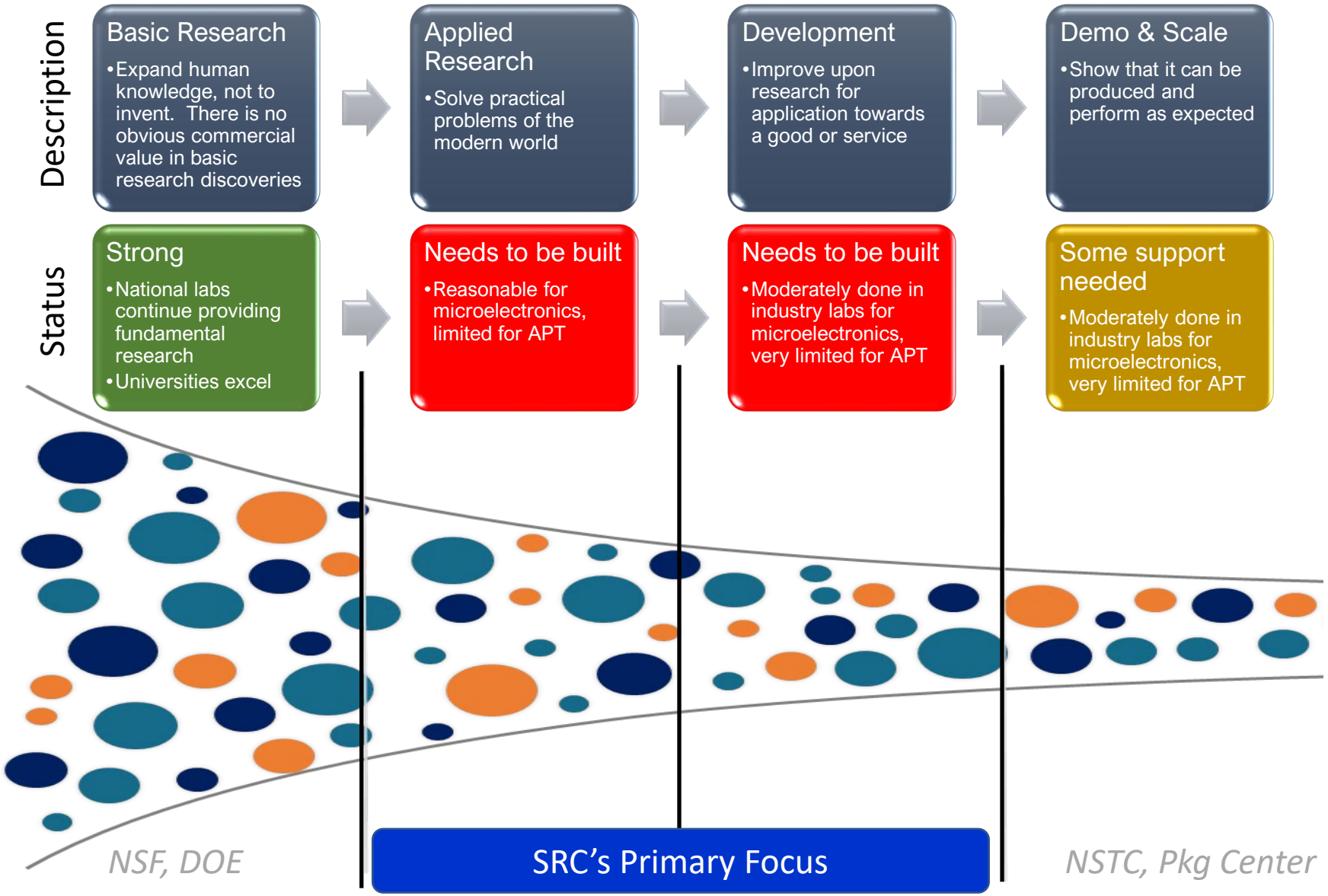
- *Since 1982, $2.2B+ in research funding, 15,000+ SRC-sponsored students, and 700+ patents issued*
- *In 2020, SRC funded $95M+ in collaborative research at 90 U.S. and 38 international universities in 14 countries*

How it Works: We Manage Collaborative R&D



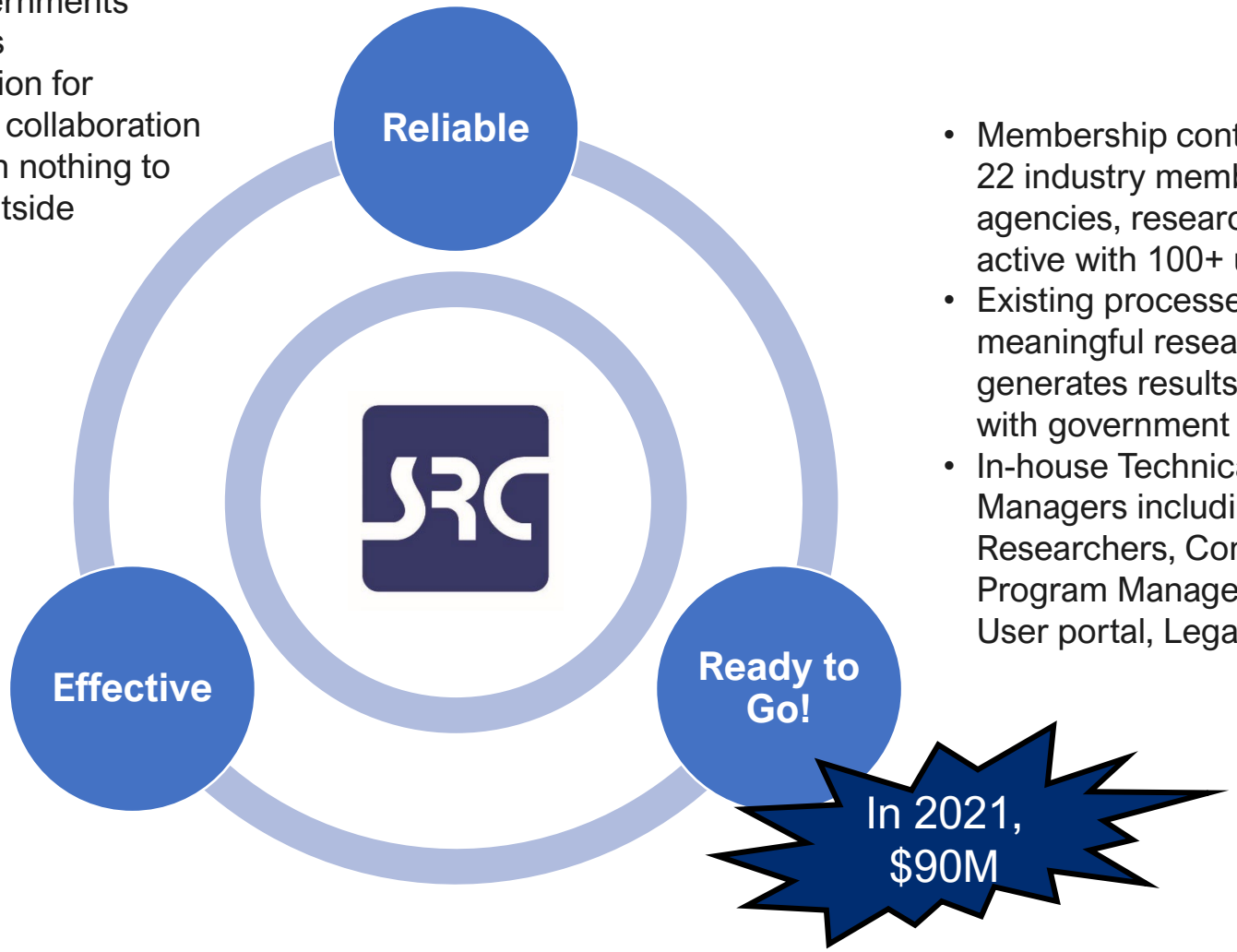
Lab-to-Fab approach to Microelectronics and Advanced Packaging (MAPT) Innovation

Establish a robust pipeline from start to finish



Why SRC is the Right Organization to Lead

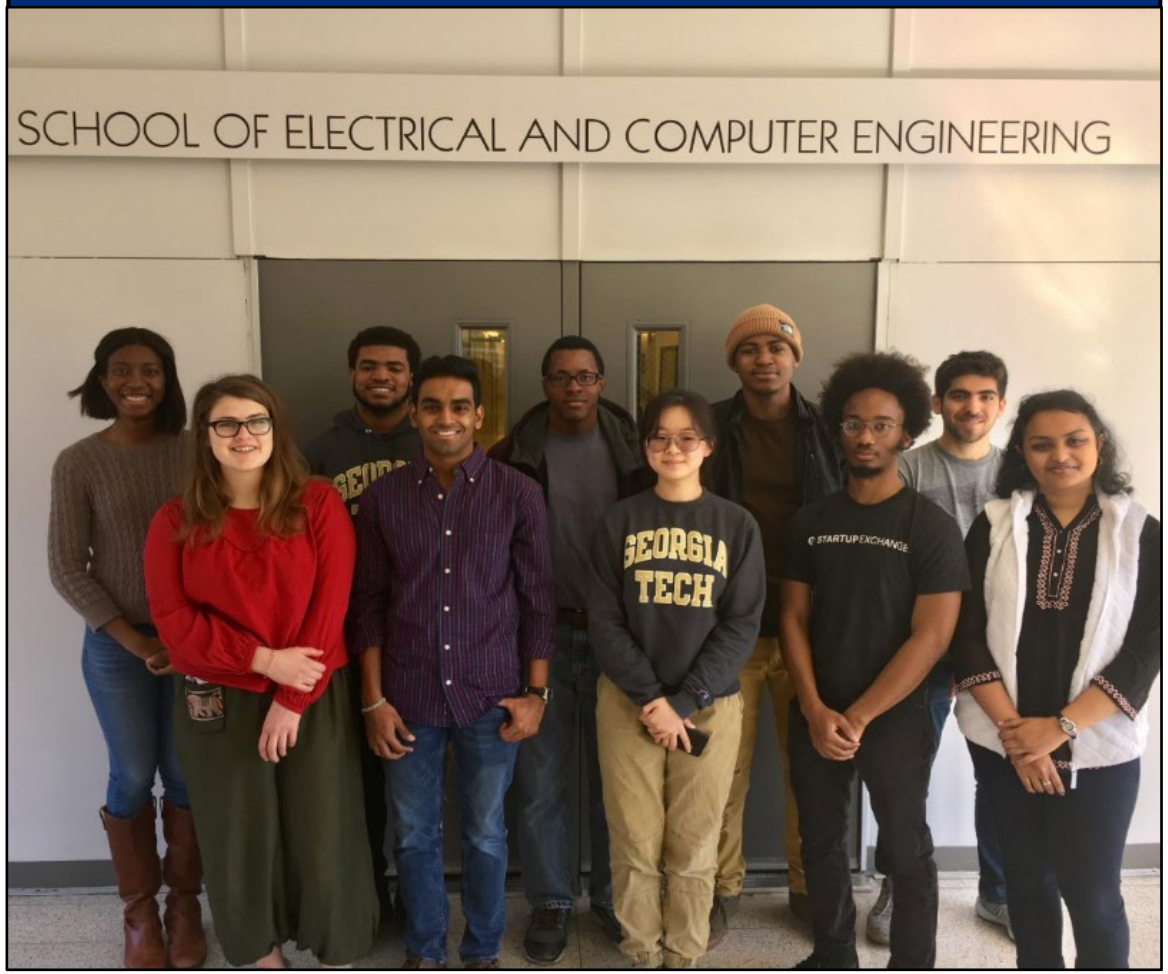
- Low risk. A 40-year history of working with companies, universities, and governments across many innovation programs
- Often sited as the go-to organization for Industry- Government- Academic collaboration
- A Non-profit, neutral 3rd party with nothing to gain and no ulterior motives or outside influences



- Membership contracts active with 22 industry members and 3 gov't agencies, research contracts active with 100+ universities
- Existing processes for defining meaningful research agenda that generates results and partnering with government
- In-house Technical Program Managers including Industrial Researchers, Contracting, Program Management, Billing, User portal, Legal, etc.

- Bringing industry for effective technology transfer that benefits the university and the market
- Develop technology that's shaped the industry for 40 years
- Consistently builds communities where they are needed

Broadening Participation



SRC's JUMP Undergraduate Research Initiative (URI) – GaTech Grad Cohort

Diverse teams and inclusive environments result in greater innovation.

Issued our 2030 SRC Broadening Participation Pledge to commit to gains in our talent pipeline.

https://www.src.org/about/broadening-participation/

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