# SBIR AND MORE

## GOVERNMENT RESOURCES--THE MISSED OPPORTUNITY FOR FUNDING INNOVATION

**Dr. Terrisa Duenas**

**March 30, 2017**

**SBIR = Small Business Innovation Research**

# "SBIR and More" Agenda

(1) Know your **vision, mission, and values**

(2) Sketch any 5 to 10 **ideas**

(3) Exchange resources to form **partnerships**

(4) Leverage **government programs**

(5) Start with an attainable **roadmap** objective

**Guidance → Goals → Team → Resources → Roadmap**

# (1) Know your vision, mission and values

- The more personal the more powerful
- Celebrate diversity and globalization
- Win and lose for the right reasons

**Guidance** → **Goals** → **Team** → **Resources** → **Roadmap**

# Original Ex SBIR Solicitation, Excerpt

SB042-035 TITLE: Physical Integrity Monitoring

OBJECTIVE: Identify and develop innovative technology for continual monitoring of structural integrity of aerospace structures.

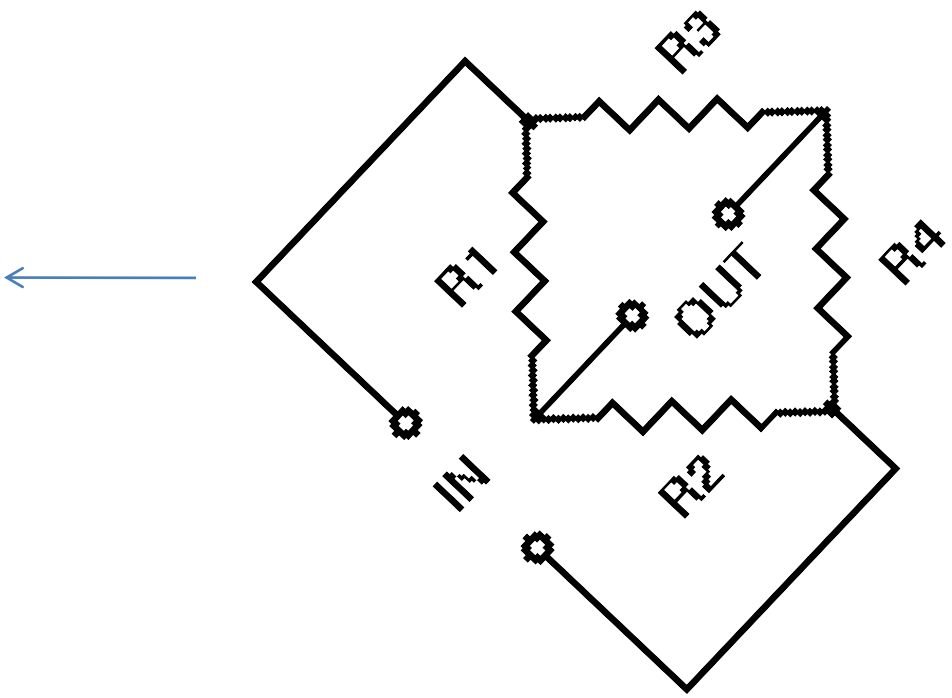
PHASE I: Conduct a feasibility study on improved performance printable electronic components. Identify materials and printing techniques that have the potential to produce active damage interrogation systems.

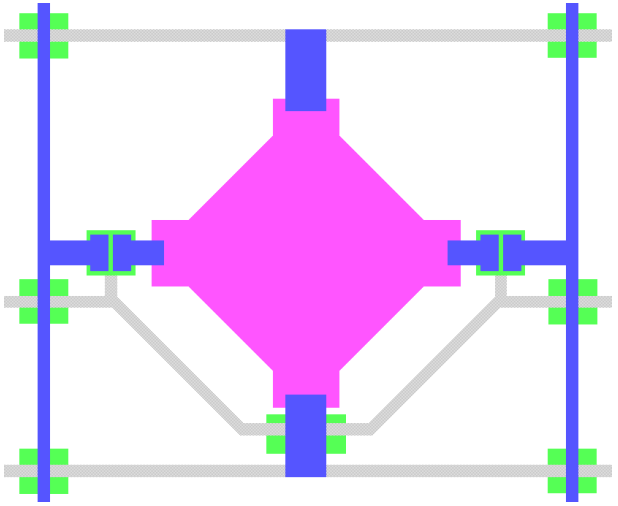
REFERENCES:

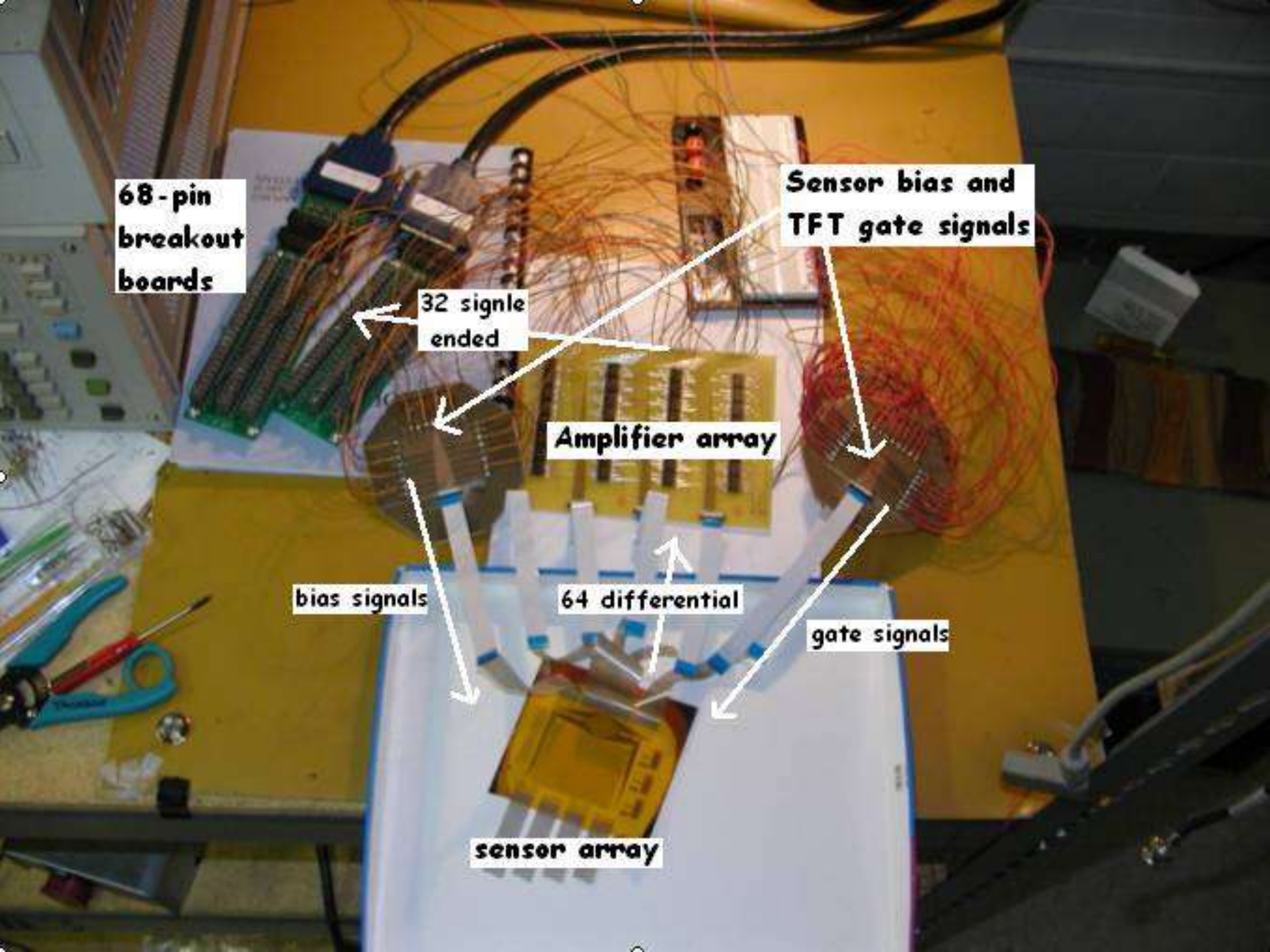
1. Kane, M. G., Campi, J., Hammond, M. S., Cuomo, F. P., Greening, B., Sheraw, C. D., Nichols, J. A., Gundlach, D. J., Huang, J. R., Kuo, C. C., Jia, L., Klauk, H., Jackson T. N., Analog and Digital Circuits Using Organic Thin-Film Transistors on Polyester Substrates, IEEE Elec. Dev. Lett., 21, 2000, 534-536

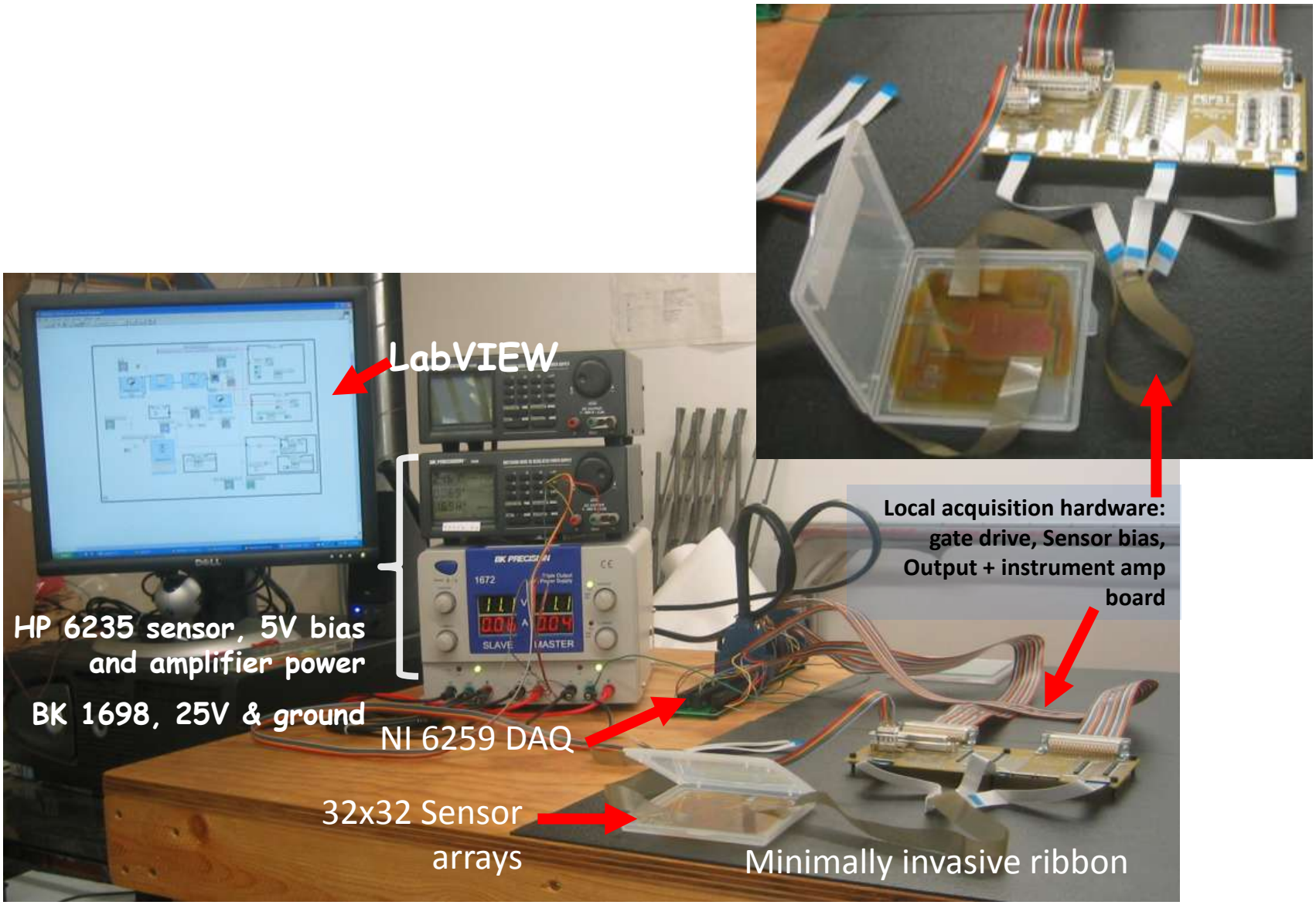
http://www.acq.osd.mil/osbp/sbir/solicitations/sbir20042/darpa042.htm accessable 3-27-2017

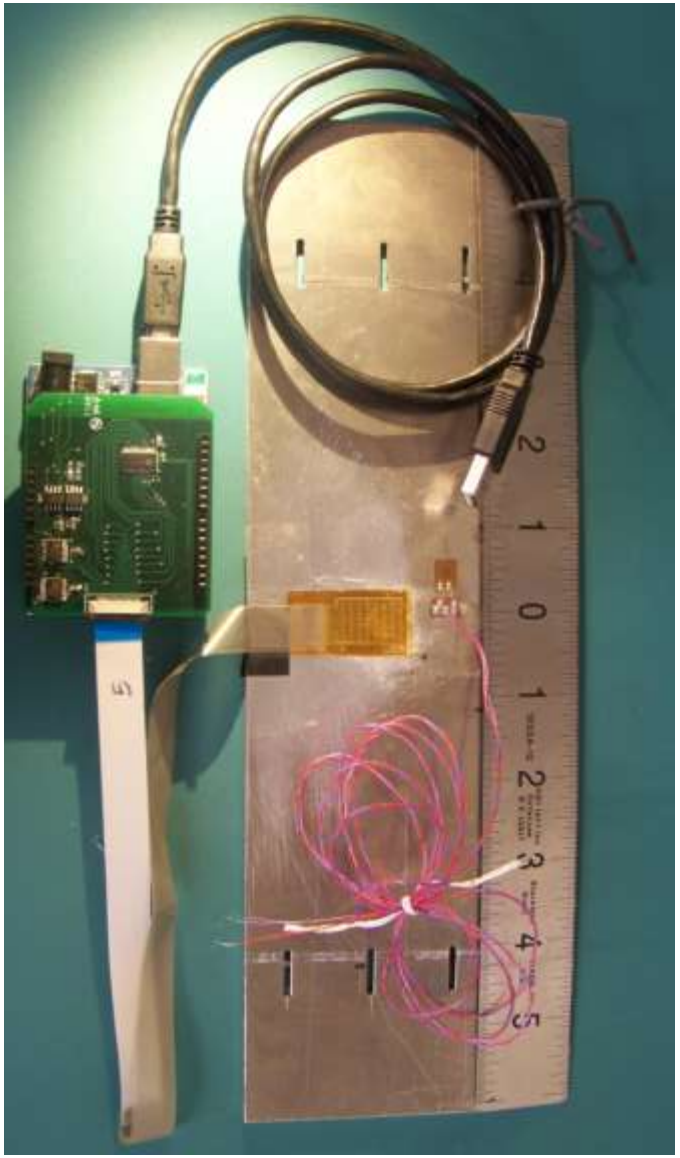
# Basis of Tom Jackson's Technology

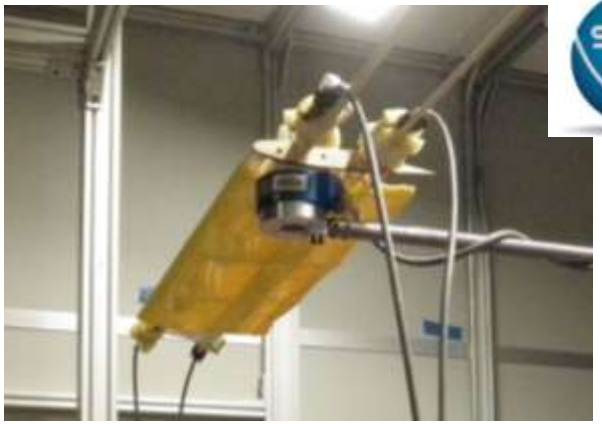


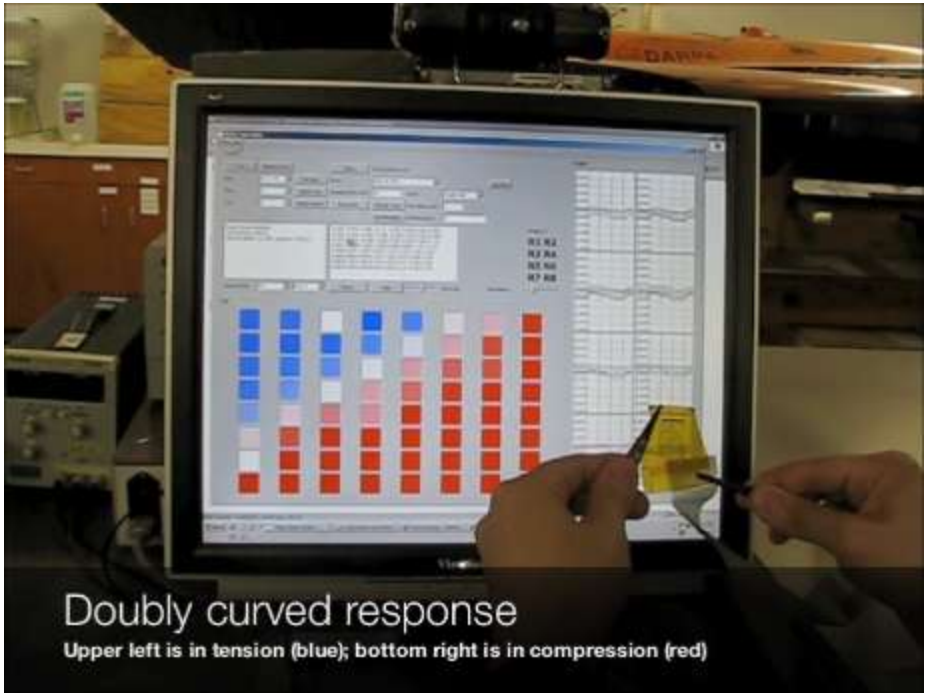

68-pin breakout boards
Sensor bias and TFT gate signals
32 signle ended
Amplifier array
bias signals
64 differential
gate signals
sensor array


LabVIEW
HP 6235 sensor, 5V bias and amplifier power
BK 1698, 25V & ground
NI 6259 DAQ
32x32 Sensor arrays
Local acquisition hardware: gate drive, Sensor bias, Output + instrument amp board
Minimally invasive ribbon





SYSTEMS TECHNOLOGY INC.



# (2) Sketch any 5 to 10 ideas

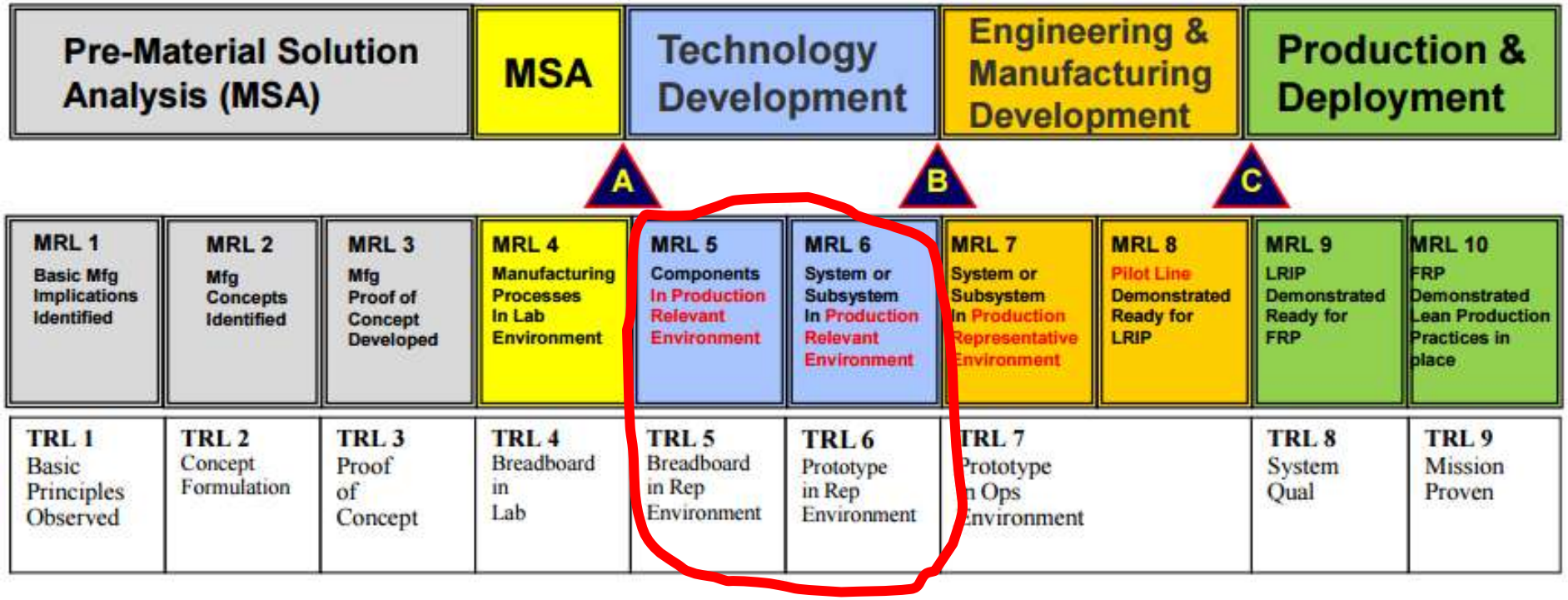

- Diversify
- Bridge gaps
- Use "Dr. T's 10% rule"

**Guidance → Goals → Team → Resources → Roadmap**

https://upload.wikimedia.org/wikipedia/commons/b/bc/Ansoff_Matrix.JPG 3-24-2017 accessed 3-15-2017, shown under Creative Commons

# Technology Readiness Levels

***Relationship to System Acquisition Milestones***

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http://www.dodmrl.com/APPROVED_AF_ManTech_MRA_Overview_2015.pdf 3-15-2017

Rep = Representative
Ops = Operational

# (3) Exchange resources to form partnerships

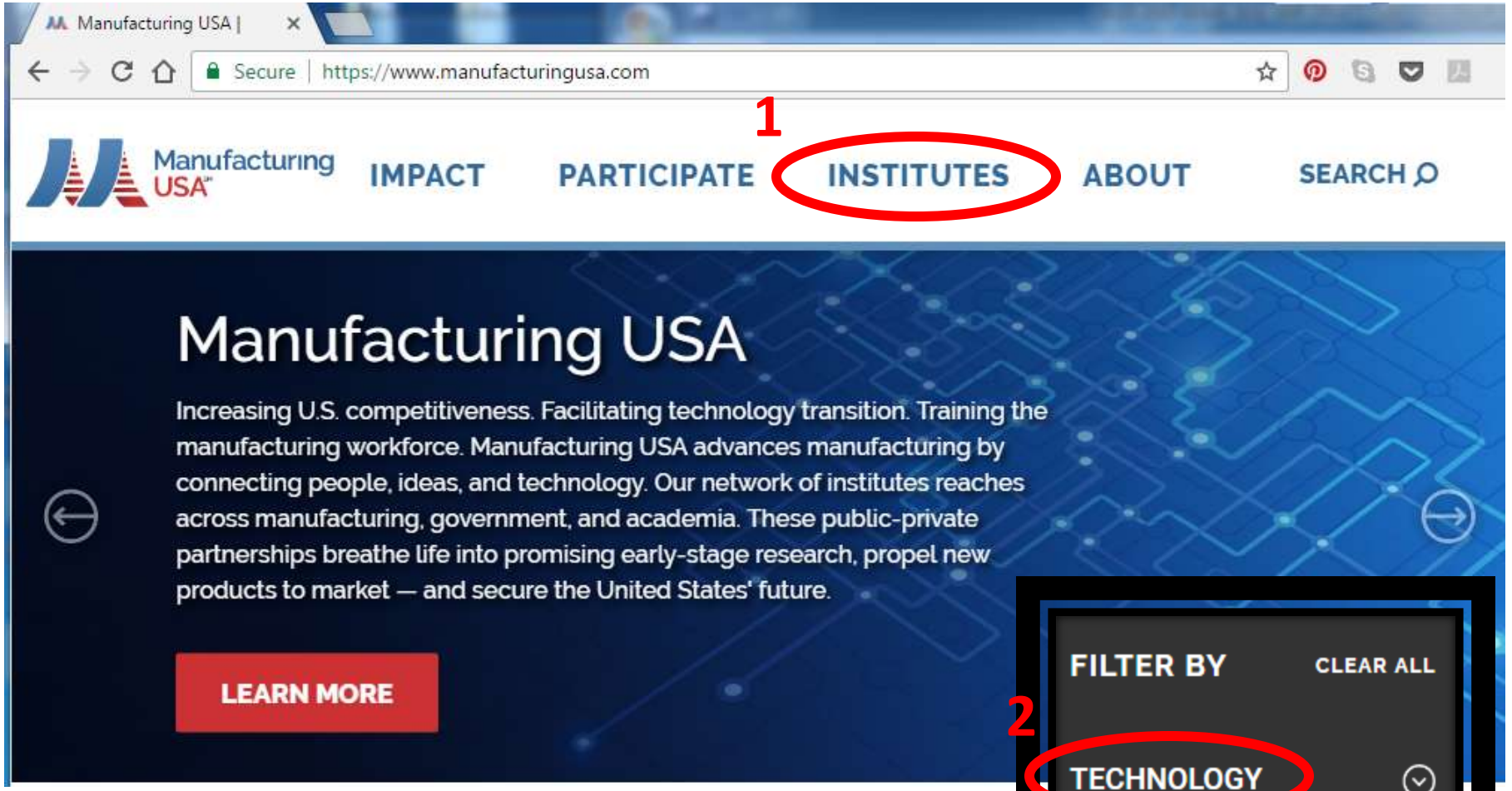
- Exchanges remove funding distraction
- Ideal time for intergenerational mentoring
- Create win-win-win partnerships

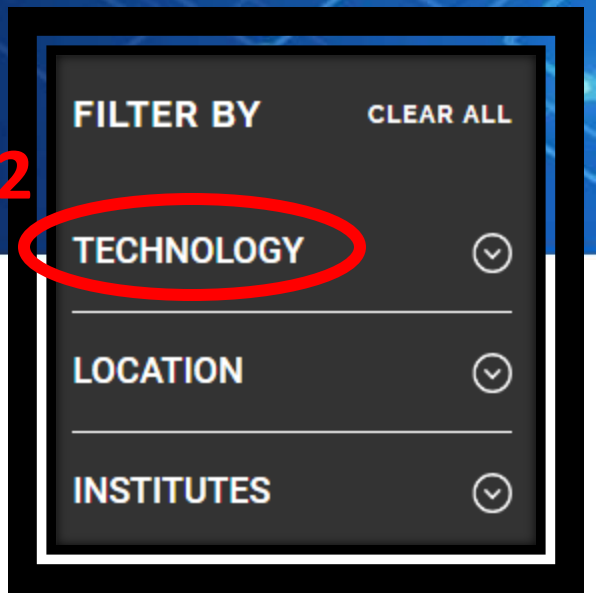
**Guidance → Goals → Team → Resources → Roadmap**

# (4) Leverage government programs

- NMMI, SBIR/STTR, BAA, IMS, others
- Context/requirements
- Subject matter expertise / mentoring
  - Team
  - Help through the valley of death

**Guidance → Goals → Team → Resources → Roadmap**




• Materials Material • Processing • Electronics • Sensors • Digital • Lightweighting • Automation • Biotechnology • Design • Modeling and Simulation • Robotics • Artificial Intelligence • Biofabrication • Chemical Processing • Metrology • Optics and Photonics • Recycling • Reuse • Sustainable Manufacturing

https://www.manufacturingusa.com/institutes 3-15-2017 3

• Digital

Optics and Photonics

3

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## Smart Manufacturing

Digital | Modeling and Simulation | Sensors

Los Angeles, CA USA

Smart Manufacturing works to spur advances in smart sensors and digital process controls that can radically improve the efficiency of U.S. advanced manufacturing.

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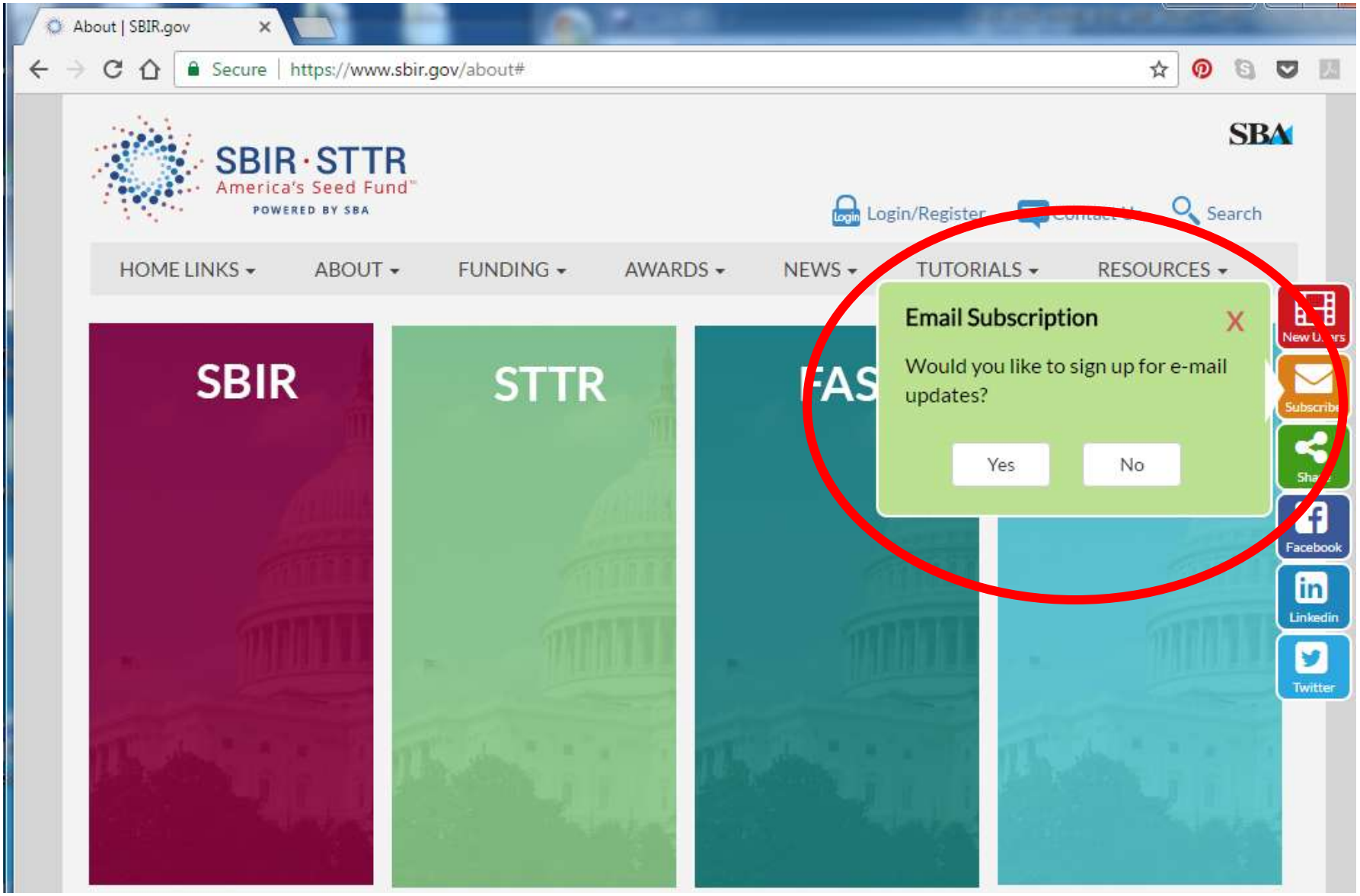


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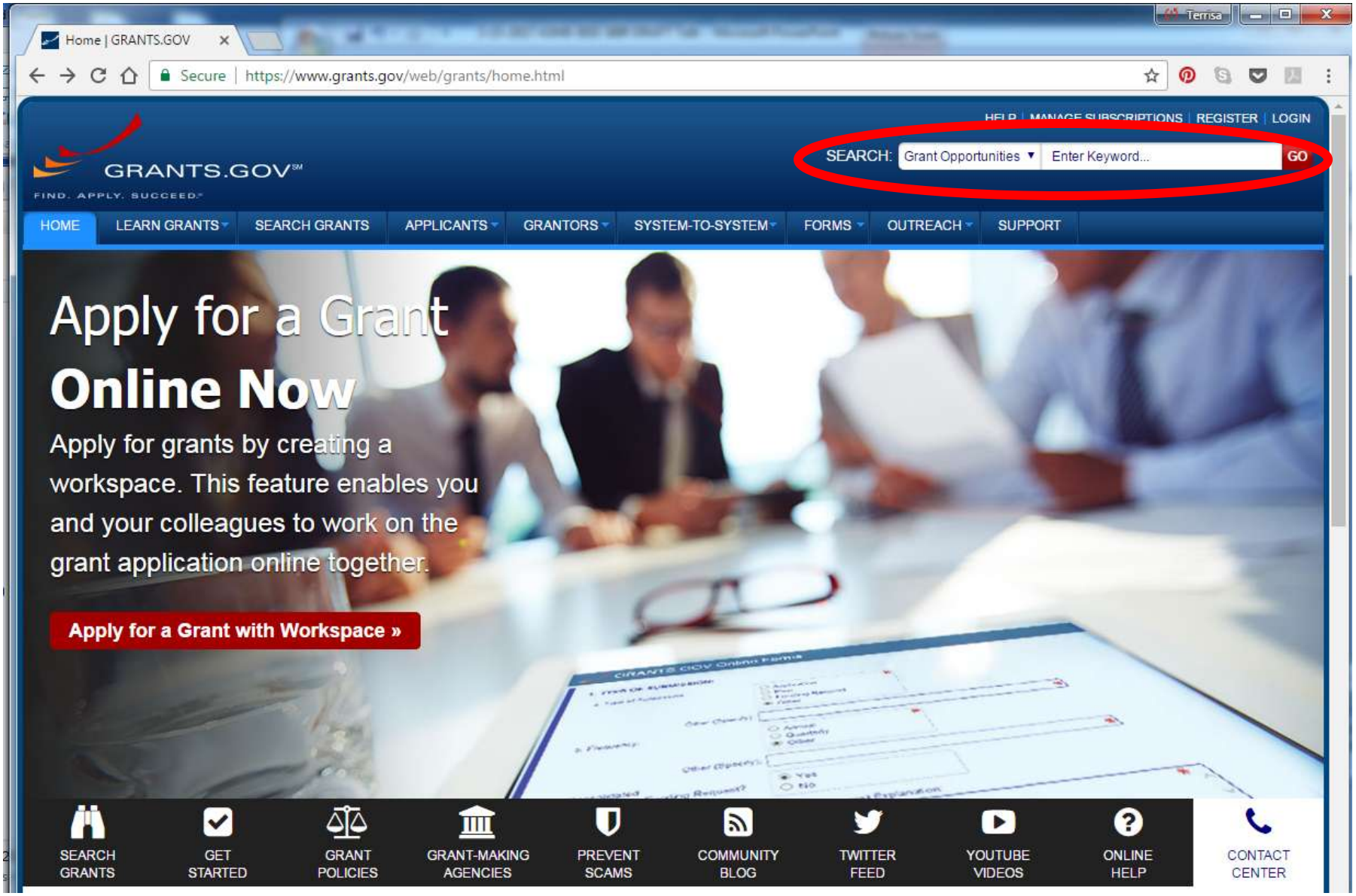


https://www.grants.gov/ 3-15-2017

# Intelligent Manufacturing Systems

*Global Research and Business Innovation Program*

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## Intelligent Manufacturing Systems

IMS is an industry-led, international business innovation and research and development (R&D) program established to develop the next generation of manufacturing and processing technologies through multi-lateral collaboration. We provide global services to institutions from our supporting Regions includin the European Union, Mexico, South Africa, and the United States of America Other Regions are encouraged to join the IMS program.

IMS offers international consortium building and coaching services provided at n charge to researchers from member countries, a listing of projects seekin partners, and a project database with valuable research information. IMS is also premier sponsor of the World Manufacturing Forum where high-level governmen officials and industry executives discuss issues and solutions to challenges i manufacturing.

ACCESS IMS PROJECTS:

- IMS Projects
- IMS2020 Roadmap

Starting to put Robotics and Industrial Internet of Things

Tweets by @IMS_ORG

IMS International Retweeted

Dan Nagy
@dan_nagy

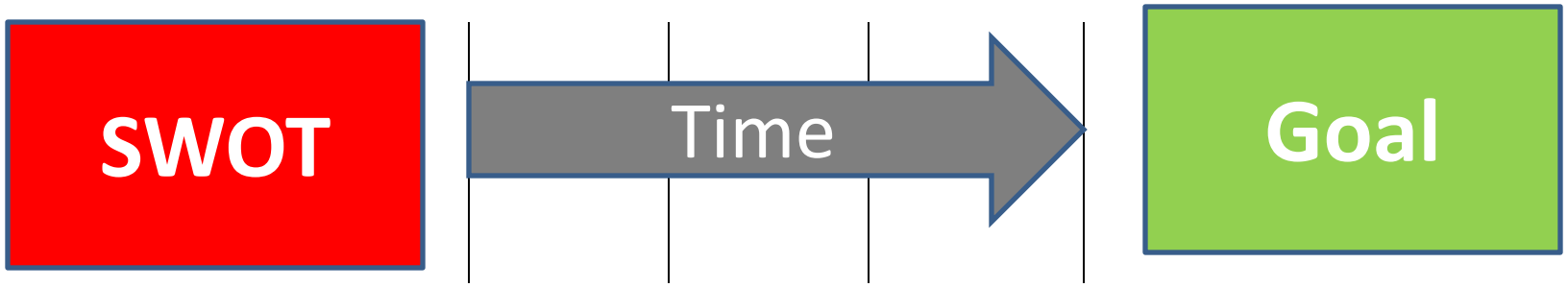
Steve Ray captures ideas at project cluster meeting for topics of interest under Industry 4.0.

http://www.ims.org/ 3-15-2017

Email: steve.ray@ims.org

# (5) Start with an attainable objective

- 3 goal variations
- Frameworks like PM, TRL/MRL, 2x2 grids




**Guidance → Goals → Team → Resources → Roadmap**

# Summary

**Make it personal**

**Exchange your resources**

**Connect with a resource**

**Guidance → Goals → Team → Resources → Roadmap**

# Sensor Acknowledgements


- Prof. John Rogers
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NEXTGEN AERONAUTICS

# Thank you


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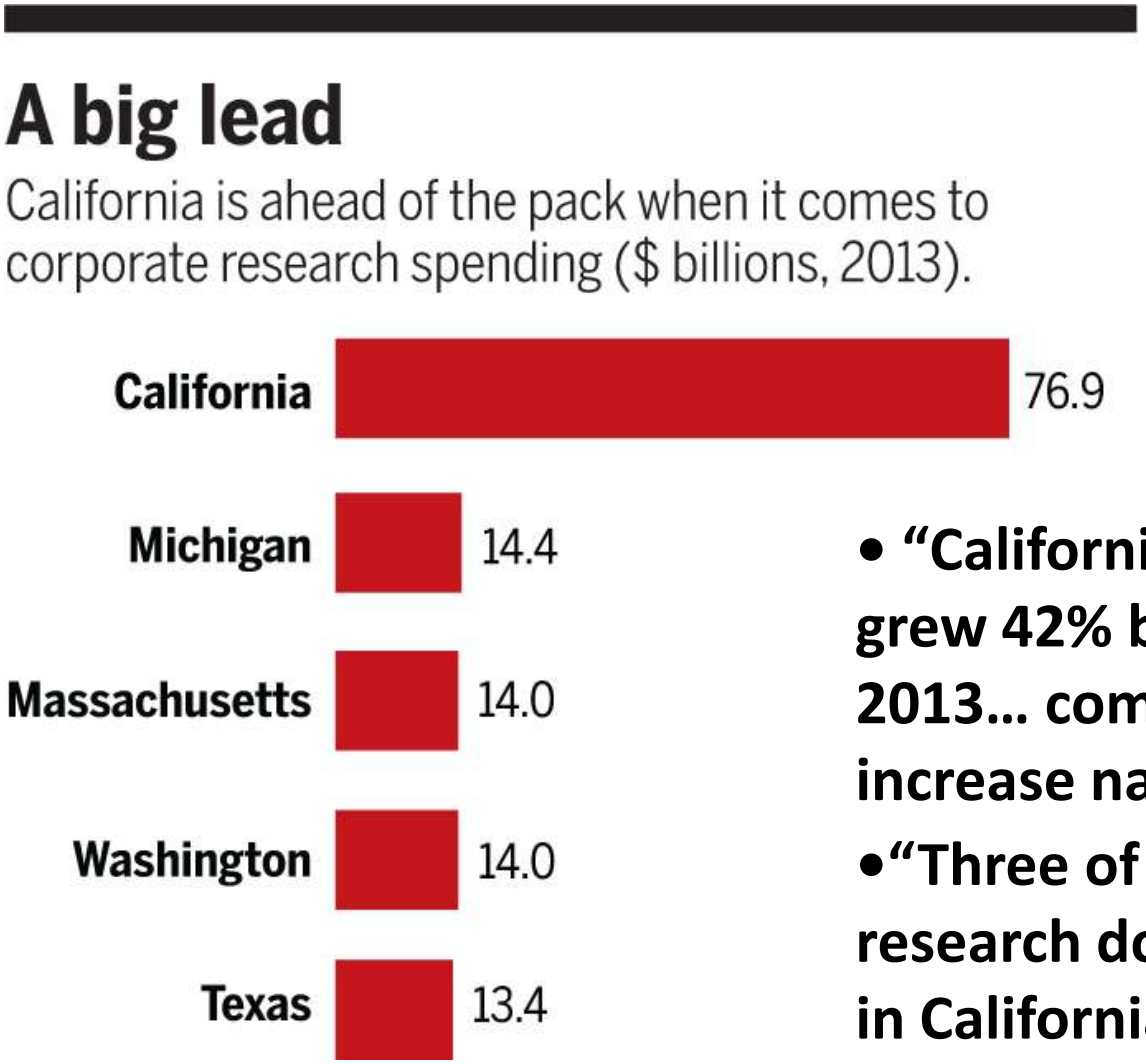
- Nathalie Gosset
- Greg Monterrosa



Thank you Dr. Stephanie O'Keeffe
for the design and review.




- **"California's research output grew 42% between 2008 and 2013… compared with a 7% increase nationwide."**
- **"Three of every 10 corporate research dollars are now spent in California."**

With course permission, "Data Check: California rules U.S. corporate research" Jeffrey Mervis, Science 04 Nov 2016, Vol. 354, Issue 6312, pp. 537

# Previous SBIR Awards

| | Agency | Phase | Award amount |
|---|---|---|---|
| 4b Low-cost Integrated Nanoreinforcement for Composite Tanks (LINCT) | DoE | 1 | $150K |
| Rad-hardening Technology for Interceptor Avionics RaTOA | MDA | 1 | $99.9K |
| Rad-hard damage-resistant Self-healing Synergistic KV (RISSK) | MDA | 1 | $99.9K |
| Carbon Nanotube (CNT) Enhanced Composite Structures | AF | 1 | $99.9K |
| Nanocomposite for Impact Mitigation in cOmposite missile skins (NIMO) | Army | 1,2+ | $730K +$120K |
| Self-hEAling morphing Kill vehicle skin (SEAK) | Army | 2 | $730K |
| Next Generation of Agile Self-Healing Strategically Tuned Resilient Composites (NASSTIC) | Army | 1 | $110K |
| Wire Insulation Incorporating Self-Healing Polymers (WIISP) | NASA | 2 | $598K |
| Printed Electronics Processing for Structural Integrity (PEPSI) | AF | 2+ | $1.05M |
| Smart Ultrahydrophobic Surface for Protecting Aircraft Components (SUSPAC) | AF | 1 | $100K |

https://sbirsource.com/sbir/people/2589-dr-terrisa-duenas 3-15-2017

# How to know your life purpose in 5 minutes | Adam Leipzig | TEDxMalibu

- Who are you?
- What do you do?  What are you supremely qualified to teach other people. In one word.
- Who do you do it for? In one word.
- What do those people want or need?
- How did those people change as a result?

Leipzig, A. (2013, February). *Adam Leipzig: How to know your life purpose in 5 minutes*. Retrieved from https://www.youtube.com/watch?v=vVsXO9brK7M 3-24-2017

# HBRs Five most commonly used innovation metrics

- Revenue generated by new products
- Number of projects in the innovation pipeline
- Stage-gate specific metrics, i.e., projects moving from one stage to the next
- Profit and Loss (P&L) impact or other financial impact
- Number of ideas generated

With permission from "What Big Companies Get Wrong About Innovation Metrics" by Scott Kirsner. May 6, 2015, hbr.org https://hbr.org/2015/05/what-big-companies-get-wrong-about-innovation-metrics