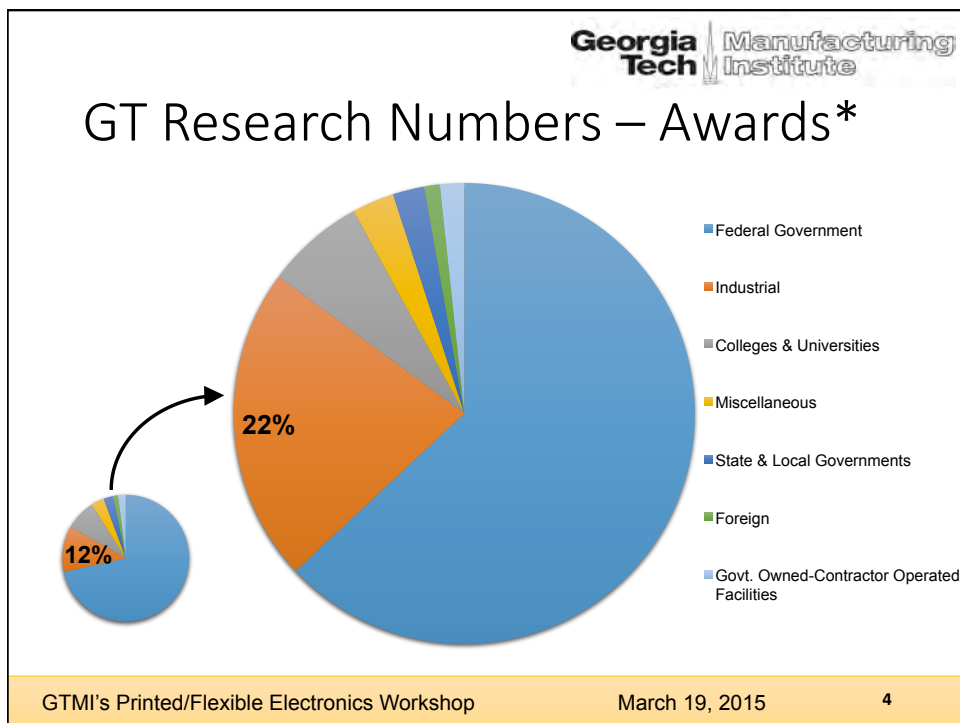
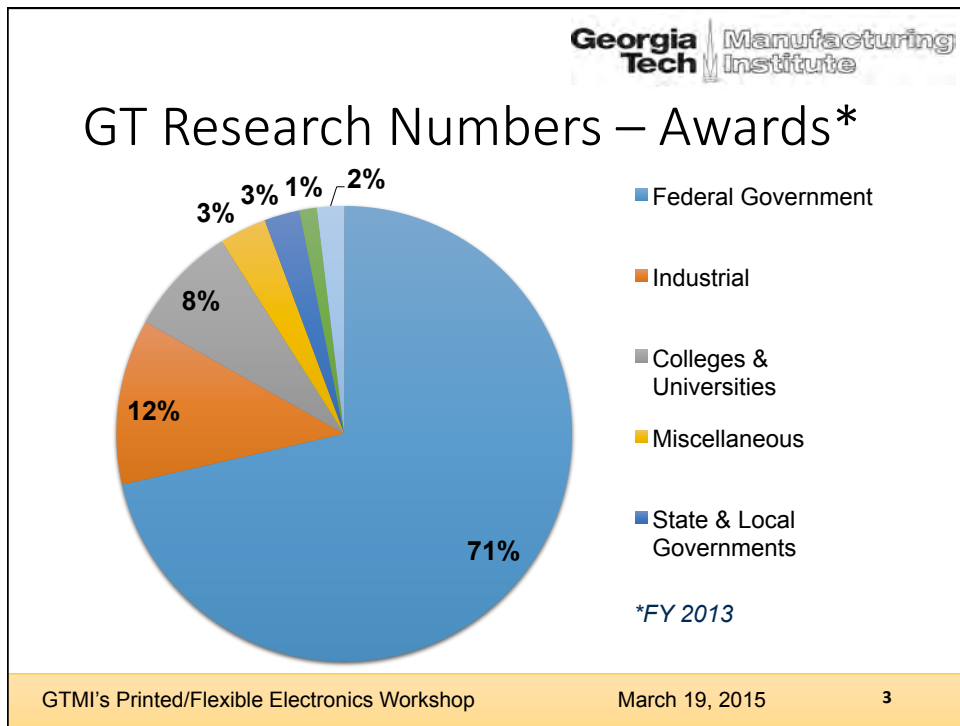


## Opportunities for Collaborative R&D with Small and Medium-Sized Enterprises

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## Business Development Goals as Research Associate

- Create strong partnerships with **industry**, academia, and government stakeholders
  - Key focus on entrepreneurs, start-ups, and small businesses (< 500 employees) involved in high-tech R&D
  - Key focus on SBIR/STTR collaborations
- Facilitate collaborations with partners/sponsors on funded R&D programs in *Advanced Manufacturing*
  - Federal or state funded grants/contracts
  - **Corporate** sponsorship



## Opportunities for SMEs

- **GA Economic Development and GT Enterprise Innovation Institute**

- Examples: GaCOI, GaMEP, ATDC, MBDA
- Lumense Chem/Bio Sensor Example



Local GA SMEs  
Small \$ Investment Required

## Lumense – GTMI Joint R&D Program

**“Aerosol-Jet Printing for Rapid Manufacturing of Polymer Recognition Layers in a Real-Time Chemical and Biological Sensor Platform”**

PI: Dr. Billyde Brown, Research Associate II, GTMI, (404)-385-1935  
[billyde.brown@gatech.edu](mailto:billyde.brown@gatech.edu)

Co-PI: Dr. Chuck Zhang, Professor, Industrial and Systems Engineering, GT,  
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**\$ 1/3**




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**\$ 1/3**      **\$ 1/3**


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9







## Expected Outcomes

1. Increased production rates and sales of sensors due to automation
  - Ability to supply rapid and widespread demand from poultry growers across GA, and the Southeast
2. Reduced labor and product costs
3. Improved product quality, reliability, and reproducibility from device-to-device

**Overall Shared Goal:** Help GA enterprises improve their effectiveness, create jobs, and positively impact the economy



**Lumense LE100  
Ammonia Sensor**



**Poultry Grow Out House**

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March 19, 2015
10

## Opportunities for SMEs

- GA Economic Development and GT Enterprise Innovation Institute

- Examples: GaCOI, GaMEP, ATDC, MBDA
- Lumense Chem/Bio Sensor Example

Local GA SMEs  
Small \$ Investment Required

- **SBIR/STTR**

- What is SBIR/STTR ?
- Motivation for SBIR/STTR in GA
- DOE Phase 0 Program
- SBIR/STTR and Manufacturing
- Upcoming SBIR/STTR RFPs

SMEs in the U.S.  
No \$ Investment Required

## What is SBIR?

- “Small Business Innovation Research” Program
- Applicants for grants/contracts are small (< 500 employees) for-profit businesses
- PI's primary employment must be with the small business (>50% of time)
- Proposing firm must perform at least 2/3rds of the R&D work in Phase I and at least 1/2 in Phase II
- Objective – Stimulate high-tech innovation and new product commercialization using federal funds

## What is STTR?

- “Small Business Technology Transfer” Program
- Applicants are small businesses in partnership with a **Research Institution (University)**
- Proposing firm must perform at least 40% of the work and the collaborating research institution performing no less than 30%
- **Objective** – to encourage technology transfer through cooperative research between **small business concerns AND research institutions**

## Phases

	SBIR	STTR
<b>Phase I Proof of Concept/Feasibility</b>	6-9 months up to \$150,000*	12 months up to \$225,000*
<b>Phase II R&amp;D toward prototype / scale-up</b>	2 years up to \$1,500,000*	2 years up to \$1,500,000*
<b>Phase III Commercialization</b>	No use of SBIR/STTR funds permitted during Phase III – but many agencies will match (1:1) funding by external investors	

\* Each agency has their own specific funding caps

## Which agencies participate?

Currently there are Eleven:

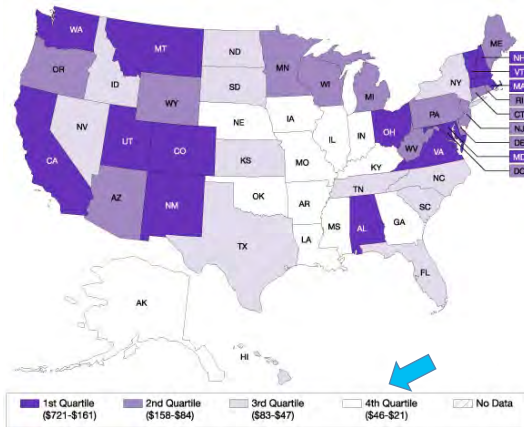
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|--|--|
| 1. Environmental Protection Agency (EPA)                       | 6. Department of Transportation (DOT)    |
| <b>2. National Aeronautics and Space Administration (NASA)</b> | 7. Department of Homeland Security (DHS) |
| <b>3. National Institutes of Health (NIH)</b>                  | 8. Department of Commerce (DOC)          |
| <b>4. National Science Foundation (NSF)</b>                    | <b>9. Department of Defense (DOD)</b>    |
| 5. U.S. Department of Agriculture (USDA)                       | 10. Department of Education (DOEd)       |
|  | <b>11. Department of Energy (DOE)</b>    |

SBIR only

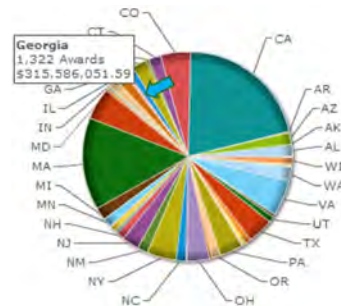
**Both SBIR & STTR**

## Motivation: GA SBIR Awards

Average SBIR program award dollars per \$1 million of gross state product: 2001–03



Total number of awards and award dollars  
Source: SBA, 2012





## DOE Phase 0 Applicant Eligibility

Women or minority owned small businesses that work with advanced technologies, located anywhere in the US and its territories

**OR**

Small, advanced technology firms located in the following 23 states and 2 territories:

AK, DC, GA, HI, IA, ID, IN, KS, LA, ME, MN, MS, MT, NC, ND, NE, NY, OK, PA, PR, RI, SC, SD, WA, WI

**AND**

Has NOT received a DOE SBIR/STTR award within the past 3 years or received duplicative technical assistance from DOE in the past 24 months for the same idea.

## DOE Phase 0 Services

- LOI Submission Assistance
- Phase I Proposal Prep, Review, Submission Assistance
- Small Business Development Training & Mentoring
- Communication & Market Research Assistance
- Technology Advice & Consultation
- Intellectual Property Consultation
- Indirect Rate & Cost Proposal Assistance

## Research Partnerships

Companies, especially smaller companies, might not have all the expertise, capabilities, facilities, and equipment necessary to carry out the proposed research.

Research partnerships with **GTMI and other GT entities** can help fill the gap.

## Manufacturing Mandate

### **Executive Order 13329: Encouraging Innovation in Manufacturing**

- “Agencies **must give high priority** to SBIR projects that are focused on **manufacturing related R&D**, in a manner consistent with the missions of the agencies and the purpose of the SBIR program.”
- Participating agencies must report annually to the SBA Administrator and the Director of the Office of Science and Technology Policy on its efforts to carry out Executive Order 13329.

## Upcoming Manufacturing Topics

E  
X  
A  
M

1. DOC-NIST (SBIR) 9.01 **Advanced Manufacturing due May 15**
  - a) Category Theoretic Tools to Support Manufacturing Information Integration
  - b) Computer Aided Standards Development (CASD) A Software Tool to Automate the Standards Development Process
  - c) High Throughput Manufacturing Methods for Engineered MRI Contrast Agents
  - d) Laser Power Meter for Manufacturing Applications
  - e) Optical Microscopy as Applied to Fabrication of Atomic Scale Devices
  - f) Predictive Modeling Tools for Metal Based Additive Manufacturing
2. NSF (SBIR/STTR) **Advanced Manufacturing (M) due June 16/18**
  - a) Personalized Manufacturing
  - b) Maker Manufacturing
  - c) Additive Manufacturing
  - d) Manufacturing for Emerging Markets
  - e) Modeling & Simulation
  - f) Sustainable Manufacturing Technology
  - g) Manufacturing Processes
  - h) Rare Earths and Critical Materials Processing Technology
  - i) Transportation Technologies
  - j) Manufacturing Technologies Involving Chemical Transformations
  - k) Machines and Equipment

# Questions ?

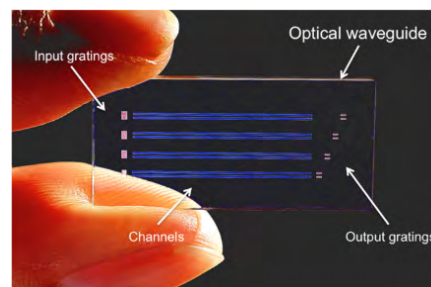
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## SBIRs Alignment with GTMI Strategy

- GTMI Strategic Imperatives key to fulfilling our Vision
  1. Engage partnerships
  2. Leverage GT knowledge and research
  3. Accelerate deployment
- SBIR/STTR
  1. Enables partnerships with startups or small companies with limited revenue stream
  2. Topics are interdisciplinary. Best approach requires crosscutting teams of GT subcontractors (e.g. GTRI, Acad. Depts., and other IRIs) to aide companies.
  3. Goal to increase commercialization. Knowledge in manufacturing is key to boosting TRL/MRL and crossing the valley of death toward commercialization or deployment.

## Project Objectives

1. Successfully deposit 4 distinct polymer-based inks or coatings onto waveguide "sense" channels
2. Control printed line quality and geometry
3. Demonstrate a rapid, scalable, and repeatable coating manufacturing process



# Enabling Technology

