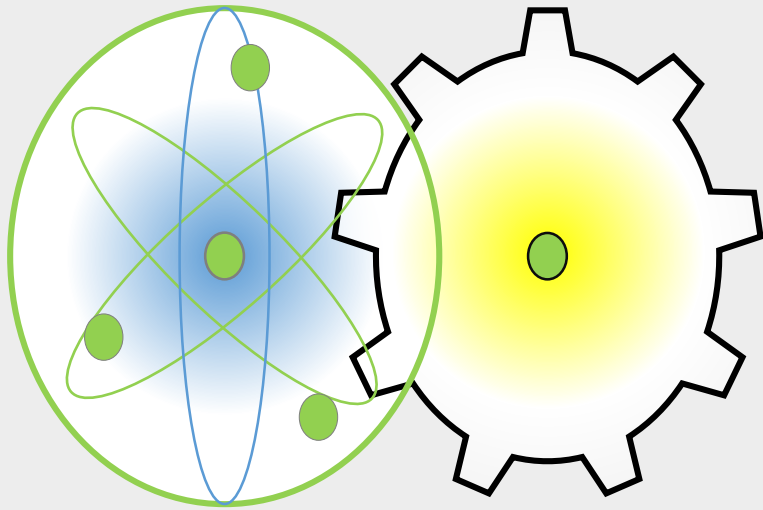


Technologist in Residence Program



Eli Levine, Program Manager, AMO



TIR Program Introduction

TIR Opportunity Statement:

Many potential industry partners lack in-depth understanding of Lab expertise and resources, or how to work with the National Labs.

Meanwhile, lab researches often do not know the most pressing industry problems. When industry and labs engage, it tends to be on a project-by-project basis, and lacks long-term strategic value for both sides.

Lastly, most lab-industry relationships, when they exist, are one-off relationships with a particular lab.

TIR Funding to Date:

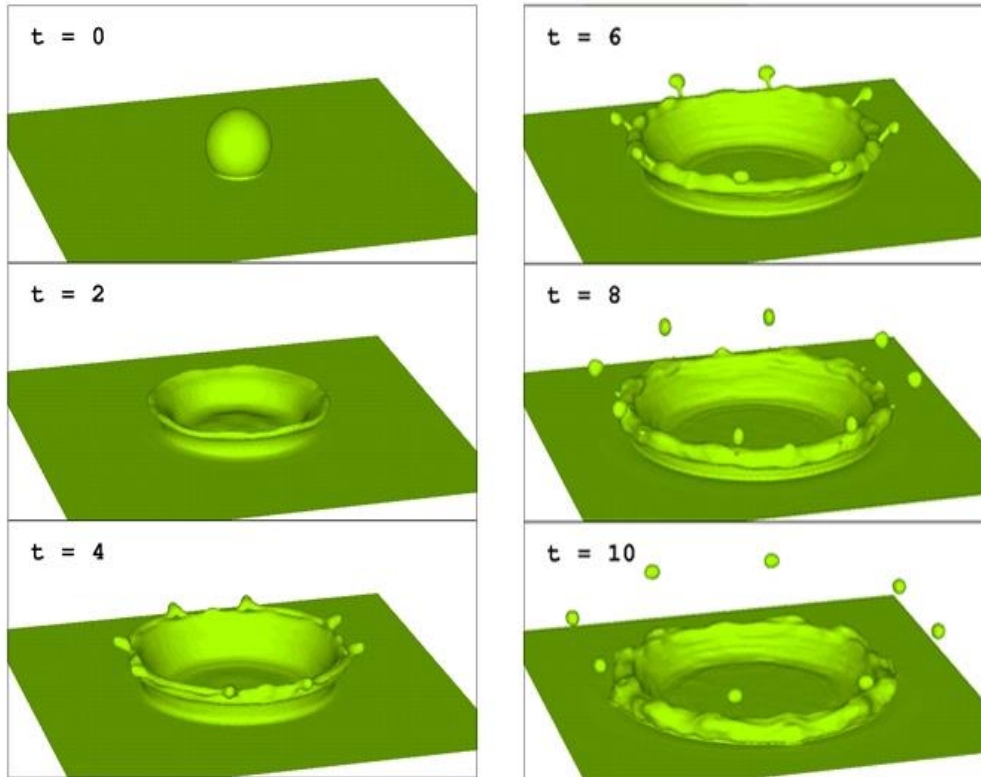
Cohort 1: \$2.6M

Cohort 2: \$2.3M

TIR will catalyze early stage R&D innovation, and help industry access the National Labs



History: Los Alamos's Industrial Fellows Program



\$1 Billion Saved
in MFG Costs

44% increase in
plant productivity

30% increase in
equipment reliability

This simulation of a droplet of liquid falling into a pool of liquid was modeled using Los Alamos National Laboratory's Computational Fluid Dynamics Library (CFDLib), and utilized by Procter and Gamble to simulate a manufacturing process.

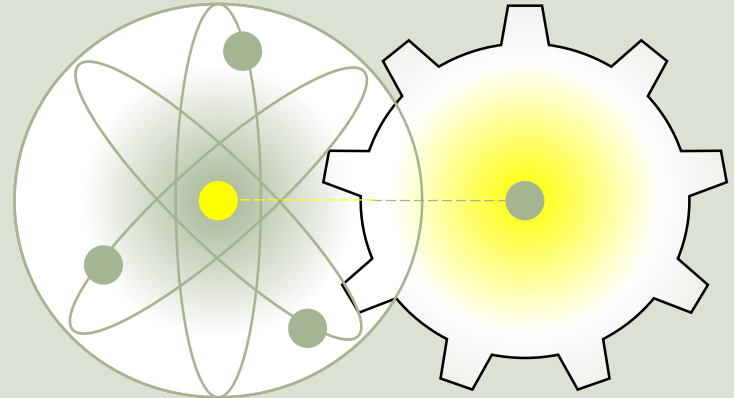
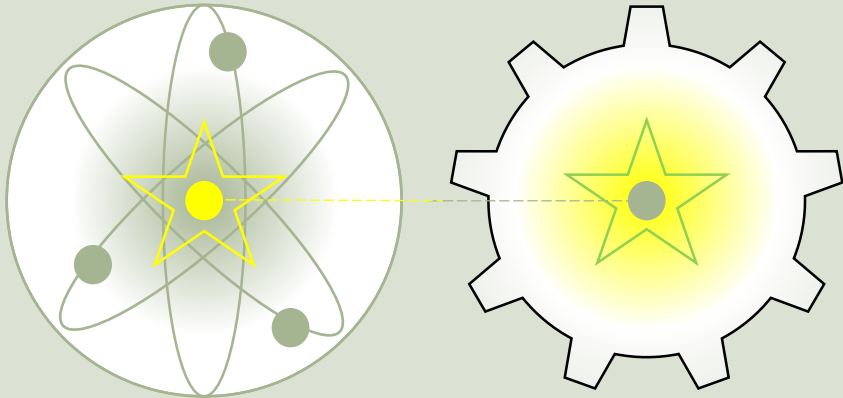
<https://energy.gov/articles/improved-manufacturing-processes-save-company-one-billion-dollars>



Technologist in Residence Summary: Model

Senior Technologists are identified within a National Lab and a manufacturing company. The Technologists work together...

...to identify new areas of collaborative research for industry and Lab, and create an agreement and specific scopes of work



Broadening beyond 'one company – one lab'...



Through the Council of Technologists, program participants will work together to access/resources across the entire Lab enterprise. The Council will also help optimize the process for Lab collaboration.

Technologist in Residence Program



Technologist in Residence (TIR) pairs senior technical staff from national laboratories and manufacturing companies to work together towards impactful manufacturing solutions.

Immediate Objectives:

- Identify areas of collaborative R&D
- Develop a streamlined method for companies to establish long term relationships with laboratories that result in collaborative research and development
- Long-term, strategic public-private partnerships

Additional Objectives:

- Enhance transparency into the national lab innovation infrastructure
- Enhance awareness of high-impact industrially relevant technology challenges within the national laboratory system; and
- Broaden and strengthen networks of Technologists in national laboratories and in industry to more effectively support industry needs and leverage the national laboratory enterprise.

Feedback from Industry:

“The Technologist-in-Residence program has been very useful and fruitful for industry. It made it considerably easier to explore, evaluate and use excellent scientific and technological resources available at National Labs. In less than a year, our TiR partnership has resulted in three separate direction of research that our company plans to pursue in collaboration with several national labs. Both national lab counterparts as well as TIR coordinators were extremely helpful in finding new areas of innovation and in establishing collaborative framework.”

- Dr. Stan Petrash, Henkel North America

“The TIR program has enabled Kyma to access state of the art capabilities and expertise at Argonne that has served to reduce the technical risk and to accelerate our rate of progress on two exciting technology development projects at Kyma. The DOE TIR program provides an opportunity for Kyma to better understand and capitalize on important new collaboration opportunities with leading scientists and to benefit from state-of-the-art capabilities housed within our nation’s DOE Laboratory System. The Argonne team, led by Dr. John Hryn and Dr. Angel Yanguas-Gil, have deep scientific expertise and have been invaluable in helping us solve difficult problems that are inherent to this kind of cutting edge research and development.”

- Keith Evans, President and CEO, Kyma Technologies



Technologist in Residence Program

Cohort One: Kicked off December 1, 2015





TIR Program Successes

ORNL – Arconic



Core Topics of Focus:

- Additive Manufacturing
- Materials Discovery
- High-Performance Computing
- High-Entropy Alloys
- Ceramic Materials
- Heat Exchangers
- Ceramic Matrix Composites
- Data Analytics
- Water Utilization
- Lightweight alloys
- Joining

Labs Engaged with:

- Ames
- LLNL
- LANL
- NETL
- NREL
- ANL
- PNNL

Results:

- 3 CRADAs at the Manufacturing Demonstration Facility
- 2 proposals funded by the HPC4MFG program
- Seedling proposal w ARPA-E
- 1 User Project at ORNL's Center for Nanophase Materials Science
- 2 Strategic Partnership Projects
- 1 License

Argonne – Cummins



Core Topics of Focus:

Powertrain systems and energy storage technologies.

- Increased flexibility for fleet operators
- Lower cost of vehicle ownership
- Partnering with regional air quality goals

Additional Potential Technology Areas for Exploration:

- Better understanding of battery system parameters
- Enhanced power electronics cooling technologies
- Thermal storage and release technologies

Labs Engaged with:

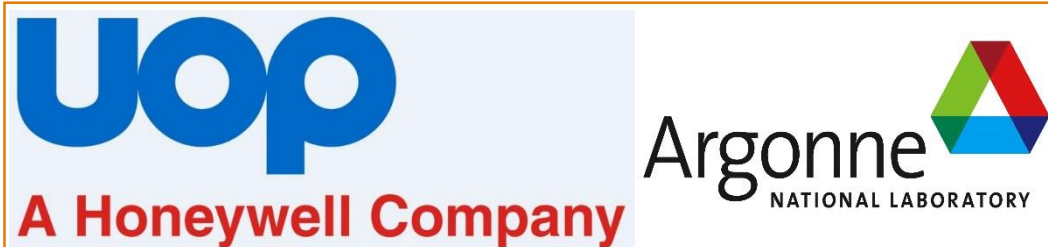
- ORNL
- NREL
- ANL
- Sandia

Results:

- 6 Statement of Work Proposals Developed Across Three Labs (NREL, ORNL, Argonne)
- 1 active CRADA

Technologist in Residence Program

Cohort Two: Rolling Application/Kickoffs 2016





Participating in the TIR program

- Cost share:** DOE will fund Lab Technologist and any potential other team members for up to \$350k. Industrial partner agrees to fund full participation of Industry Technologist, as well as any costs for Lab above DOE's commitment.
- Participation:** 18 – 24 months
- Eligibility:** Department of Energy National Laboratories are eligible to apply as the primary applicant. The proposal must also include an industry partner that is committed to participating. To be eligible, the lab proposal must identify both the senior representative of the industry partner and the senior representative of the DOE National Laboratory that would participate. For this lab call, "industry partner" is defined as a senior representative of a manufacturing company, consortia of companies. At DOE's discretion, DOE may consider other entities that are similar to the types of entities listed in the sentence above.
- Merit Review Criteria:**
- (1) Innovation, Technical Focus, Project Plan, and Approach (60%)
 - (2) Team and Resources (40%)



How to Apply

Participant Selection

- DOE issues a call for proposals to the laboratories, posted on EERE Exchange.
- Applications evaluated on a rolling basis
- Applications will describe:
 - The broad area of technical focus to be explored by the Technologists in Residence and how the technical focus relates to AMO objectives
 - The approach and activities the pair proposes to carry out to meet the pilot's and the pair's objectives
 - The specific workplan including a budget, metrics, and milestones
 - The background and capabilities of the individual Technologists and any additional support or resources provided by the participating companies and labs



Merit Review Criteria

Criterion 1: Innovation, Technical Focus, Project Plan, and Approach (60%)

Innovation:

Degree to which this proposal demonstrates additionality: a new relationship between Labs and a private sector industry partner, a new approach to working together, or a previously unexplored area of focus.

Technical Focus:

Degree to which the industry partner's technical challenges and Laboratory's suite of capabilities fit the scope of the program;
The extent to which the pair has sufficiently identified the challenges of a particular technology area that enables exploration of expertise and resources at the National Laboratories;
Degree to which the pair is well-suited to address the identified challenges; and
Degree to which the identified private sector technical challenges, if solved, will meet the objectives of the Clean Energy Manufacturing Initiative.

Approach and Work Plan:

Degree to which the approach detailed in the work plan will achieve the program goals and expectations;
Degree to which the proposed activities will result in increased collaborative research and development between the proposed industry partner and DOE National Laboratories;
Degree to which the proposed activities enable relationship building between the Labs and the participating company/companies;
Degree to which the approach has been clearly described and thoughtfully considered;
Degree to which work plan and task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed work plan will succeed in meeting the program objectives; and
Degree to which the proposal has demonstrated understanding of potential risk areas involved in the proposed work, and mitigation strategies to address them.

Metrics, Milestones, and Budget:

The strength of the proposed metrics and milestones, such that meaningful interim progress will be made and measured, and inform future efforts; and
The reasonableness of the budget and spend plan for the proposed project and objectives.



Merit Review Criteria

Criterion 2: Team and Resources (40%)

Team Competency:

The capability of the proposed team and available resources to address all aspects of the work plan with a high chance of success based on the technical credentials of the technologists; qualifications, relevant expertise, and time commitment of the individuals on the team;

The ability of the Lab technologist to represent the resources of his or her own Laboratory, and to help the pair navigate across the entire National Lab enterprise; and

Degree to which the Industry Technologist can represent the industry partner's technical challenges and to devise and enact corporate research and development strategies.

Resources and Support:

How well the supporting resources from the Laboratory and industry partner support the program objectives and commitment to the pair's success.



Metrics and Milestones

Milestones for technologist pairs include:

- Development of a framework partnership agreement that can be modified with statements of work as they are identified
- Creation of Statements of Work to be added to the agreement by the end of the pairs' participation in the Pilot

Technologist pairs may propose additional intermediary milestones.

Metrics to be reported by technologist pairs include:

- Number of National Labs visited to build relationships, explore ideas, and evaluate resources
- Time spent embedded at Lab or in Industry
- Number of scopes of work for R&D collaborations
- Meetings with leadership and staff from either Labs or industry to brief and consult about proposed potential ideas for R&D
- An assessment of how much a change (from Lab-push to commercial-needs pull) the partnership effected in the proposed R&D collaborations
- Scopes of work for proposed collaboration that have moved to contract negotiation or execution