UPISC UNIVERSITY OF PITTSBURGH INFRASTRUCTURE SENSING

COLLABORATION WORKSHOP

NATIONAL ENERGY TECHNOLOGY LABORATORY

2023 UPISC Annual Workshop Introduction

Prof. Paul R. Ohodnicki, Jr.

University of Pittsburgh

Dr. Ruishu Wright

National Energy Technology Lab.

Date: November 8th, 2023

Cathedral of Learning University of Pittsburgh

2023 UPISC Annual Workshop

GOALS

The goals of the workshop are to increase awareness of existing on-going research and collaborations with University of Pittsburgh and regional stakeholders in the following areas:

1. Development of novel sensor technologies as solutions to infrastructure sensing needs;
2. Regional collaboration to promote workforce development in the emerging sensor area for near-term R&D capability needs and future deployment and commercial needs;
3. Engagements with industry and stakeholders, regarding sensor technologies and related technology transfer;
4. Team and collaboration partnerships capable of responding to funding agencies' and industry's call for sensor technologies.

Voice of Industry and Government Stakeholders	Technology Maturation and Technology Transfer	Workforce Development

2023 UPISC Annual Workshop

SCOPE

The workshop particularly seeks to focus on the following areas:

1. Multiple sensing platforms with spatially distributed sensing capability (e.g. optical fiber sensing, passive wireless sensors, electrochemical sensors, chip sensors)
2. Spanning sensor technology development areas from fundamental principles of sensor materials to prototypes in field validations, prototypes in field validations,

IMPACT

The workshop seeks to promote intelligent infrastructure sensing for the following impacts:

1. Predictive monitoring before infrastructure failures occur (structural, electrical, etc.)
2. Mitigation of green-house gas emissions,
3. Enabling large-scale H_2 transportation,
4. Supporting needs for a robust and resilient electricity and natural gas transportation and delivery system,
5. Early detection of environmental contamination.

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Natural Gas, Oil, & H_2 Transport & Storage

Civil (Road, Bridges, Water)

Electricity Grid Transport & Storage

Conventional & Renewable Generation

Mission: UPISC Seeks to Pursue Research and Innovation, Workforce Development, and Technology Transfer in the Area of Critical Infrastructure Sensing and Monitoring

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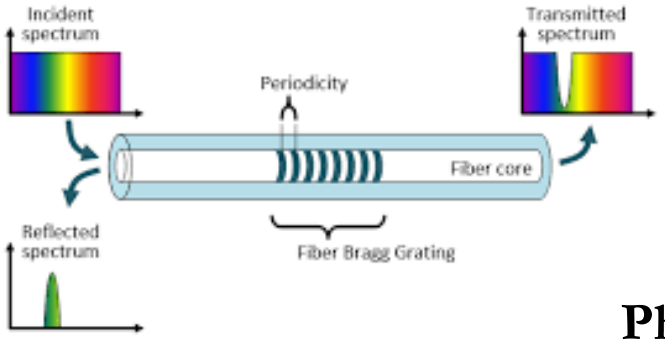
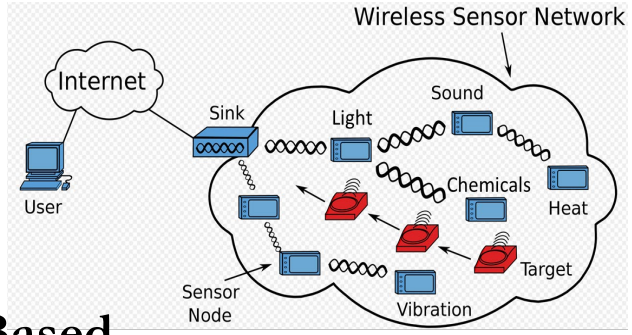
Optical Fiber Sensing



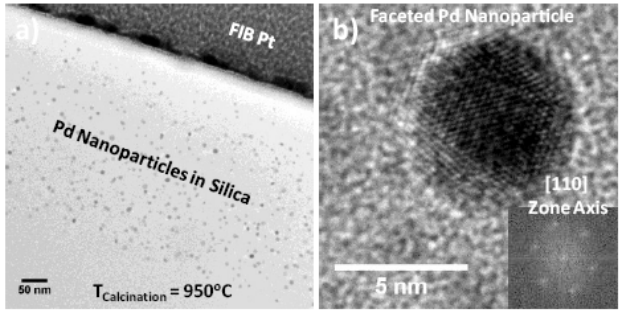
Passive Wireless Sensing



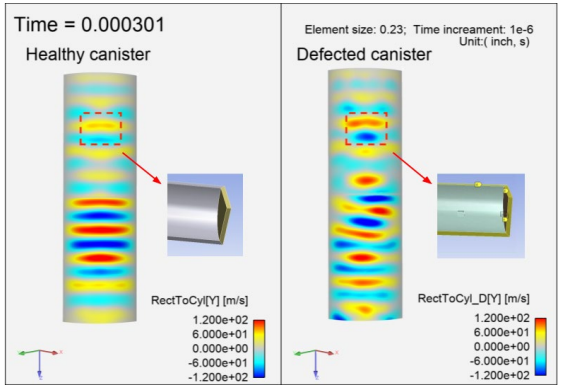
https://en.wikipedia.org

Physics Based

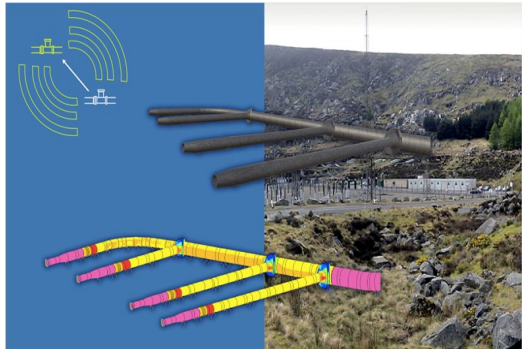
Novel Sensing Materials



Machine Learning & AI



Digital Twin Models



Enabling Technologies: UPISC Scope Encompasses all Aspects of Critical Infrastructure Sensing Spanning Enabling Technology, Hardware, Communications, Data, and Analytics.

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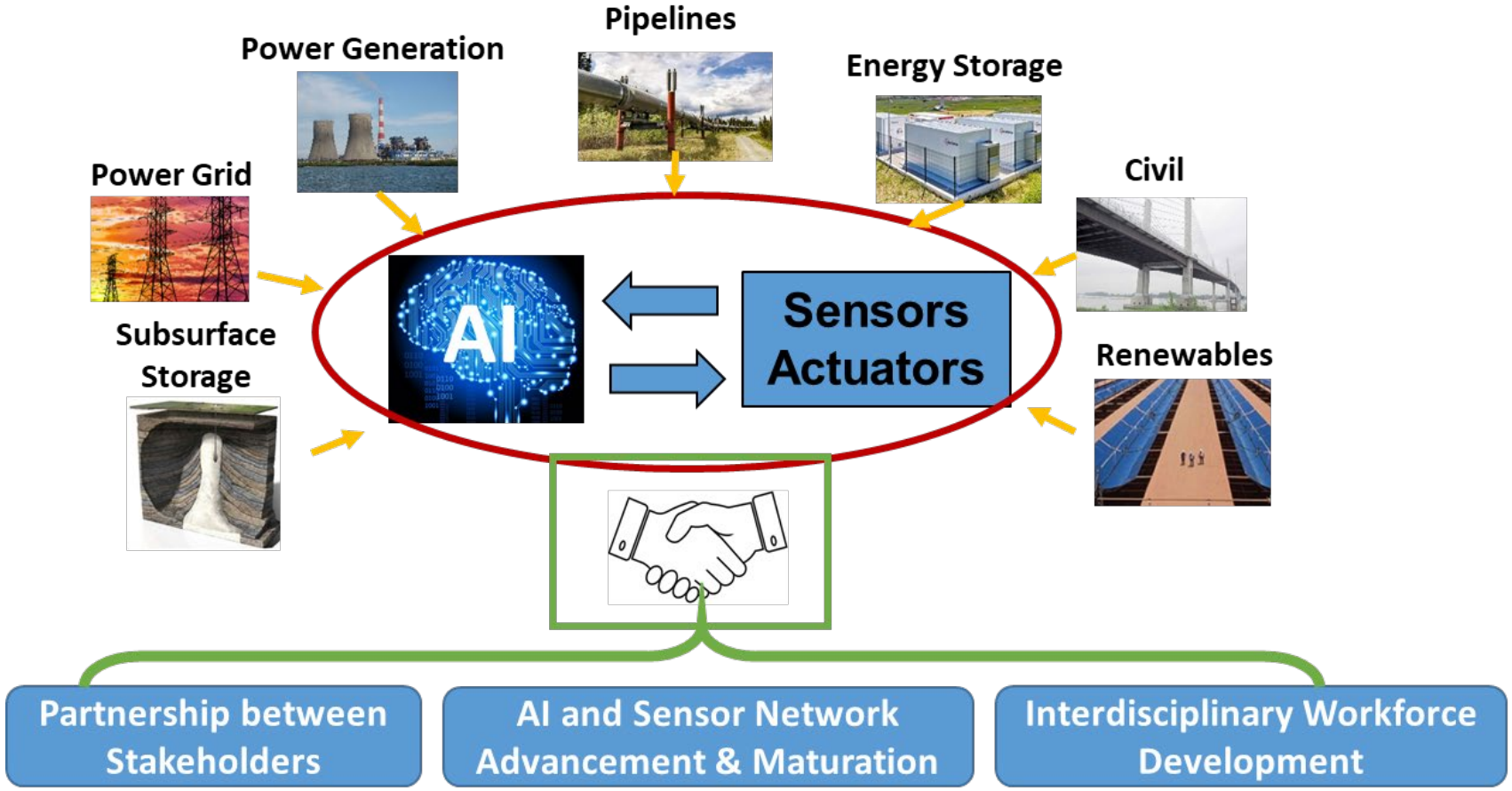
Objective of UPISC Workshop : Community and Partnership Development



University, Lab, Industry, and Government Partnerships are Necessary to Maximize Impact

2023 UPISC Annual Workshop

STEERING COMMITTEE MEMBERS

The steering committee is a group of prominent scientists and leaders that were carefully selected to represent key segments and application areas of critical importance to the UPittISC objectives. The advisory group provides the faculty and leadership team with insights about emerging needs and trends within relevant industries and across various agencies.

Tony Lindsay, GTI, Managing Director, tlindsay@gti.energy

Josh Gould, Duquesne Light Company, Director, Innovation, jgould@duqlight.com

Susan Maley, Electric Power Research Institute (EPRI), Program Manager, smaley@epri.com

C. Ravi, Aquatech, ravic@aquatech.com

Saba Almalkie, Ansys, Engineering Manager, Digital Twins, saba.almalkie@ansys.com

Robert Lieberman, Lumoptix, President, lumoptix@aol.com

Gary Choquette, Pipeline Research Council International (PRCI), gchoquette@prci.org

Arvind Tiwari, GE Research, arvind.tiwari1@ge.com

2023 UPISC Annual Workshop Registered Attendee Organizations

Bechtel Plant Machinery, Inc.
Quality, Integrity, Excellence

THE CITY OF PITTSBURGH

GE VERNOVA

U.S. DEPARTMENT OF ENERGY

Westinghouse

DLC
DUQUESNE LIGHT CO.

Sandia National Laboratories

gecko robotics

NAVAL NUCLEAR LABORATORY

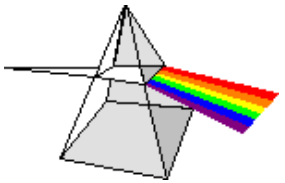
NRECA
America's Electric Cooperatives

PITT | UPCAM
CENTER FOR ADVANCED MANUFACTURING

NATIONAL ACADEMIES
Sciences Engineering Medicine

GTI ENERGY

Pitt SCI
School of Computing and Information



PITT | SWANSON ENGINEERING

SENSIBLE PHOTONICS

PITT OHIO
SUPPLY CHAIN • GROUND • LTL • TL

PRCI
Pipeline Research Council International
LEADING PIPELINE RESEARCH

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

University of Pittsburgh
Dietrich School of Arts and Sciences

2023 UPISC Annual Workshop : Agenda

Time	Activity
8:00 a.m.	Welcome Remarks and Introduction to the Workshop (Objective, Scope, Steering Committee)
8:10 a.m.	University and NETL Speaker Introduction
8:15 a.m.	UPitt and NETL Speakers – Sensing Collaborations and UPISC • 10-min presentation – Dr. Mike Holland, Science Policy and Research Development, U. of Pittsburgh Dr. David Vorp, Sr. Associate Dean for Research, U. of Pittsburgh • 10-min presentation – Dr. Bryan Morreale, Executive Director, National Energy Technology Laboratory
8:35 a.m.	Update on UPISC and Progress on Prioritized Action Items From Workshop #1 • 10-min Presentation – Dr. Paul Ohodnicki, RK Mellon Faculty Fellow in Energy, University of Pittsburgh • 5-min Q&A
8:50 a.m.	Keynote Industry Speaker #1
8:55 a.m.	Topic One – Keynote – The National Academies Perspective on Infrastructure and Sensing • 20-min Presentation – Dr. Cameron Oskvig, Director Board on Infrastructure and the Constructed Environment, National Academy of Sciences • 10-min Q&A
9:25 a.m.	Workshop Logistics – Day One, Morning
9:25 a.m.	Break

2023 UPISC Annual Workshop : Agenda

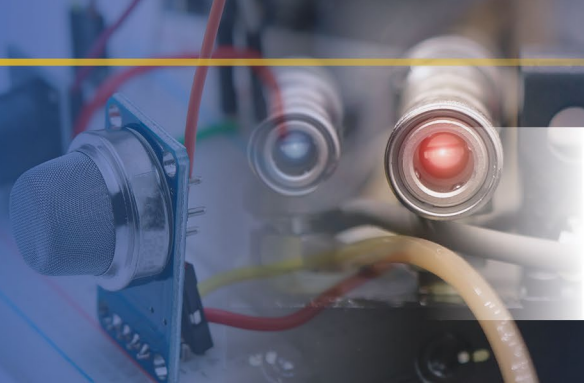
Time	Activity
9:40 a.m.	Topic Two Speaker Introduction
9:45 a.m.	Topic Two – Invited – Standardization of Sensing, Data, and Analytics Across Infrastructure Segments • 20-min Presentation – Dr. David Krohn, IEEE Fiber Optic Sensor Standards, P2067 **(REMOTE)** • 10-min Q&A
10:15 a.m.	Topic Three Speaker Introduction
10:20 a.m.	Topic Three – Sensor Device Technologies Progress Updates (Optical, Passive Wireless, etc.) • 15-min Presentation (NETL) Dr. Ruishu Wright, Technology Portfolio Lead, NETL • 15-min Presentation (Pitt) Dr. Paul Ohodnicki, RK Mellon Faculty Fellow in Energy, U. of Pittsburgh • 10-min Q&A
11:00 a.m.	Panel on Sensing Opportunities and Needs in H2 Infrastructure (Dr. Wright Moderator) Industry, University and National Lab Perspective • 5 min Panelist 1 (DOE Program) – Evan Frye, Physical Scientist, US DOE Headquarters • 5 min Panelist 2 (National Lab and H2 Hubs) – Dr. William Buttner, Physical Scientist, NREL • 5 min Panelist 3 (NETL Technology) – Dr. Nate Weiland, National Energy Technology Lab • 5 Min Panelist 4 (Industry) – Dr. Chris Moore, Technical Program Manager, GTI Energy • 5-min Panelist 5 (Industry) – Dr. Troy Demmer, CPO, Co-Founder, Gecko Robotics • 30-min Moderated Q&A
12:00 p.m.	Logistical Announcements / Lunch / Networking Break

2023 UPISC Annual Workshop : Agenda

Time	Activity
1:15 p.m.	Afternoon Announcements
1:20 p.m.	Keynote Speaker #2 Introduction
1:25 p.m.	Topic Four – Keynote – Digital Twins Applied to Infrastructure Sensing • 20-min Presentation – Dr. Arvind Tiwari, Program Manager, GE Vernova • 10-min Q&A
1:55 p.m.	Topic Five Speaker Introduction
2:00 p.m.	Topic Five – Invited – Electric Power Grid Sensing, Analytics, and Digital Twins • 20-min Presentation – Jeremy Gill, Interim Chief Information Officer, Duquesne Light Company • 10-min Q&A
2:30 p.m.	Topic Six Speaker Introduction
2:35 p.m.	Topic Six – Invited – Wireless Networking and Integration (Sensing, Data and Communication) • 20-min Presentation – Christopher Ziolkowski, R&D Manager, GTI Energy, Wi-SUN Alliance **(REMOTE)** • 10-min Q&A
3:05 p.m.	Break

2023 UPISC Annual Workshop : Agenda

Time	Activity
3:30 p.m.	Panel on Sensing Opportunities and Needs in Transportation / Civil Infrastructure (Dr. Ohodnicki Moderator) Industry, University and National Lab Perspective • 5-min Panelist 1 (DOT Representative) – Chris Atkinson, Deputy Director, ARPA-I / DOT • 5-min Panelist 2 (Technologies – U. Pitt.) – Dr. Piervincenzo Rizzo, Full Professor, U. of Pittsburgh • 5-min Panelist 3 (IRISE Consortium – U. Pitt.) – Joseph Szczur, Executive Director of IRISE, U. of Pittsburgh • 5-min Panelist 4 (City of Pittsburgh) – Chase Klingensmith, Autonomous Vehicles Policy Analyst, Pittsburgh • 5-min Panelist 5 (City of Pittsburgh) – Michael Bethune, Policy Analyst, Pittsburgh • 30-min Moderated Q&A
4:25 p.m.	Summary of Action Items and Preparation for Report Out
4:30 p.m.	Looking to the Future and Next Steps (Ohodnicki, Wright, Steering Committee) • Workshop closeout report discussion • Where we go from here and how to be involved • Etc.
5:00 p.m.	Final Remarks and Poster Session Summary
5:05 p.m. –6:30 p.m.	Poster Session with a Social Hour and Light Refreshments



Any Questions, Comments, or Discussion?