# Calit2 – Increasing Interaction Between Industry and University Researchers

**Swedish American Entrepreneurial Days**
**Calit2@UCSD**
**University of California, San Diego**
**April 9, 2008**

**Dr. Larry Smarr**
**Director, California Institute for Telecommunications and Information Technology**
**Harry E. Gruber Professor,**
**Dept. of Computer Science and Engineering**
**Jacobs School of Engineering, UCSD**

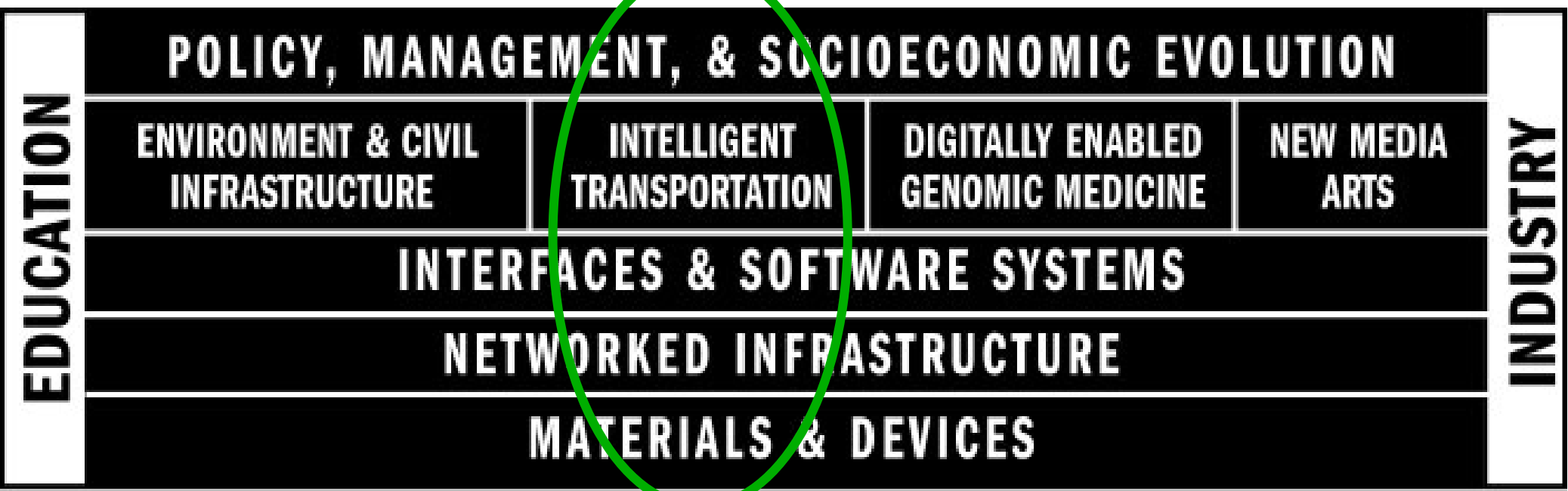
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# Calit2 Continues to Pursue Its Initial Mission:

**Envisioning How the Extension of Innovative Telecommunications and Information Technologies Throughout the Physical World will Transform Critical Applications Important to the California Economy and its Citizens' Quality Of Life.**

# Calit2--A Systems Approach to the Future of the Internet and its Transformation of Our Society

**Calit2 Has Assembled a Complex Social Network of Over 350 UC San Diego & UC Irvine Faculty From Two Dozen Departments Working in Multidisciplinary Teams With Staff, Students, Industry, and the Community**



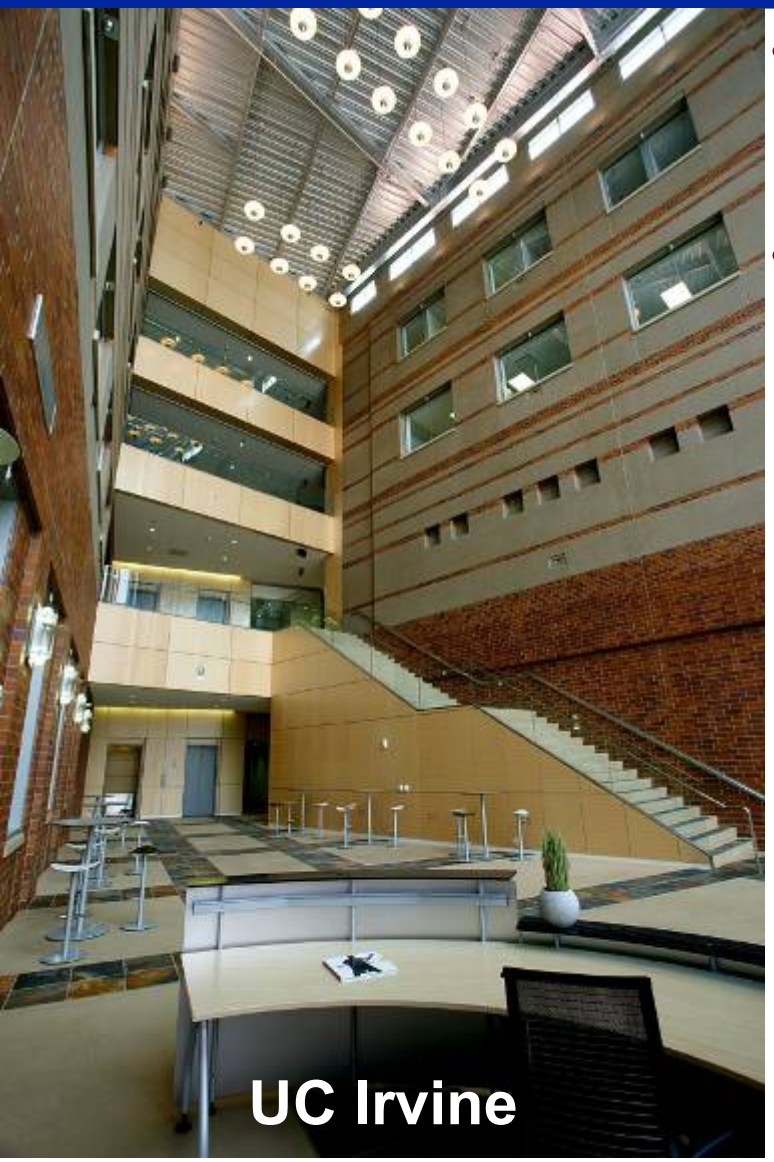

**Integrating Technology Consumers and Producers Into "Living Laboratories"**

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**www.calit2.net**

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# Two New Calit2 Buildings Provide New Laboratories for "Living in the Future"




- "Convergence" Laboratory Facilities
  - Nanotech, BioMEMS, Chips, Radio, Photonics
  - Virtual Reality, Digital Cinema, HDTV, Gaming
- Over 1000 Researchers in Two Buildings
  - Linked via Dedicated Optical Networks



www.calit2.net

Partnered with Over 100 Companies
Faculty Have Won Over 300 Grants

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# Calit2 Works Closely with San Diego and Orange County Industrial Groups

SDSIC NETWORK San Diego Software Industry Council

CommNexus™ San Diego A Network of Communications Companies

OCTANe Fueling Innovation Development in Orange County

BIOCOM Accelerating Life Science Success

SAN DIEGO DEFCOMM A Defense and Space Technology Consortium

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# Calit2 Has Sought to Increase the Entrepreneurial Culture on Both Campuses

IGNITING TECHNOLOGY

Knobbe Martens Olson & Bear LLP
Intellectual Property Law

Calit2

VON LIEBIG CENTER

**Accelerating Innovation** Advisory services and seed funding to advance commercialization of Jacobs School discoveries



Presenters (from left) Perry, Johnsson, Scacchi and Tomlinson are joined by Calit2's Korean partners via high-speed video teleconferencing.

VentureForth @ UCSD

5th Annual Entrepreneurship Conference

Nov 17, 2007 @ CALIT2 UCSD

## Entrepreneurs Forum

OCTANe@UCI

TECH COAST ANGELS

TechTIPS UCSD

## So You Want to Form a Startup?

**Guest Speaker:** Alvin Viray
senior licensing officer, UCI Office of Technology Alliances

OCVG

## UCSD STARTUP BOOTCAMP:

*A 'How'd They Do That?' on Forming Companies*

Tuesday, May 9th, 2006
9 am - 5 pm
UCSD Atkinson Auditorium

CONNECT®
Accelerating Innovation in San Diego

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# Calit2 Industrial Partners
# Team with Academic Research and Education

- Funding Joint Research Projects
- Endowing Chaired Professorships
- Sending Staff to Live at Calit2
- Supporting Graduate/Undergraduate Fellows
- Providing Equipment to Calit2 Projects
- Joining on Federal Grants
- Granting Access to Industry Facilities
- Using Calit2 Facilities
- Commercialization of Faculty/Staff/Student Research
- Co-Sponsoring Workshops/Conferences
- Hosting Seminars or Lectures
- Joint Support of Centers (CWC, CITA, CNS…)

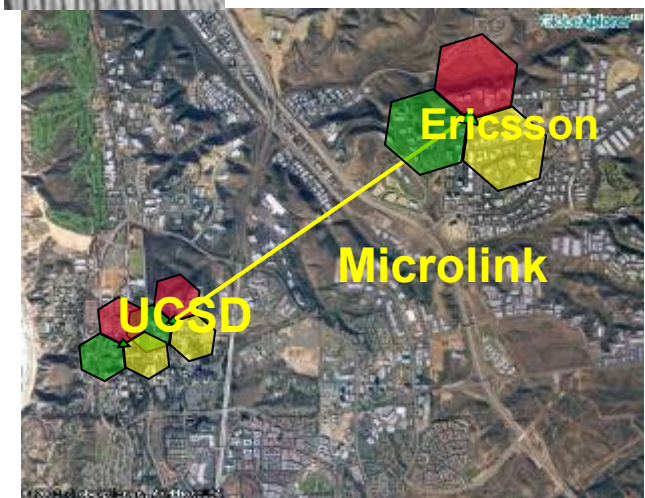
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# Ericsson: a Calit2 Industrial Partner with Breadth and Depth

- **Sponsored Research: Non-Exclusive Royalty Free**
  - **$ 6.2 Million with UC Discovery Match**
  - **17 Professors, 17 Students, 4 Post-docs**
- **27 Student Fellowships**
- **Two Endowed Chairs; Two Faculty Fellowships**
- **Collaborations**
  - **Magnus Almgren: Taught Course in ECE**
  - **Jaap Harsten, Bluetooth Hands-On Course**
- **Infrastructure**
  - **Base Stations, Always Best Connected**
- **Help with**
  - **New Federal Grants: $22.5 Million**
  - **Inspired Two Startups**



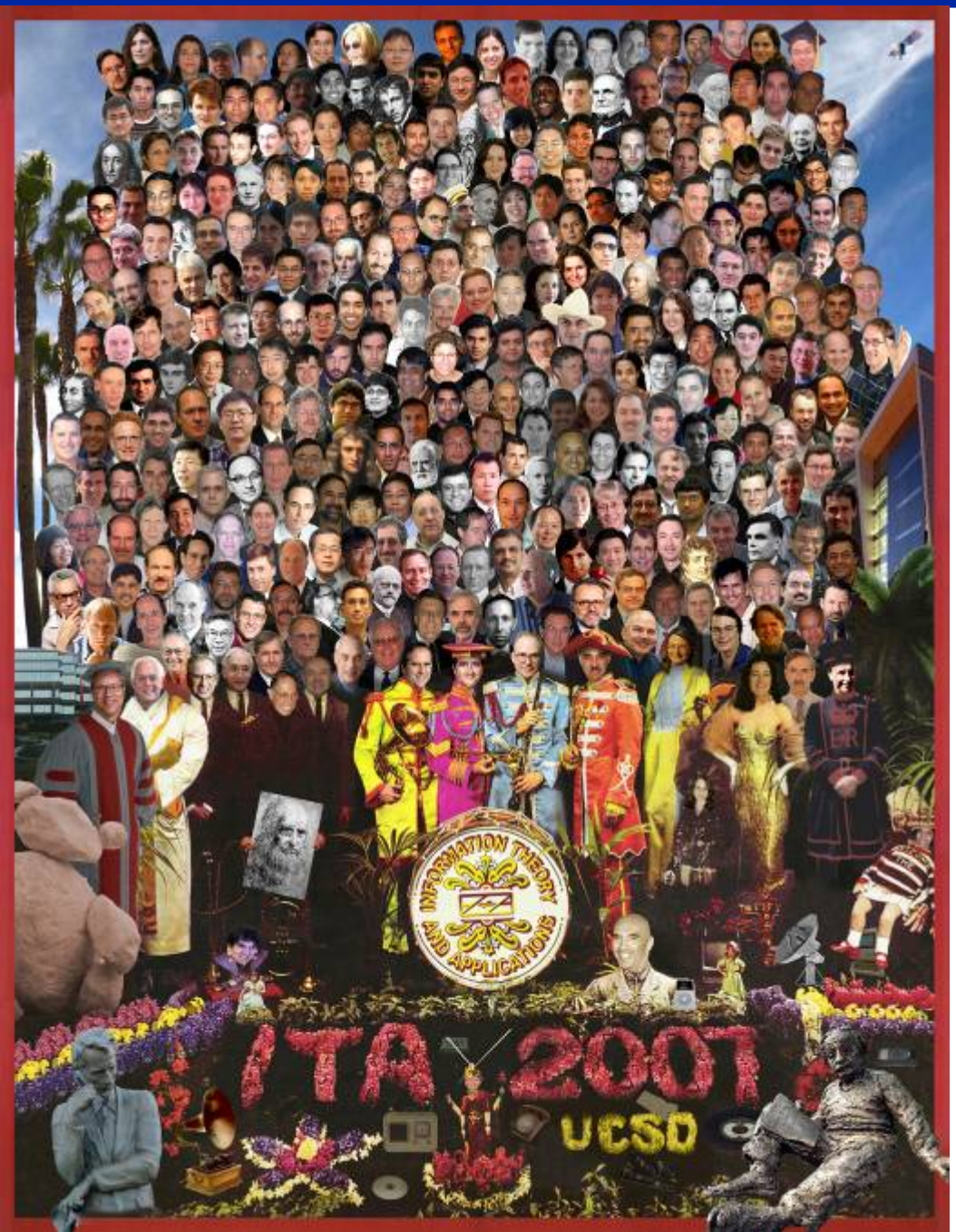





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UCSD Jacobs School of Engineering

# The New Center for Information Theory and Applications in Calit2 Has Become a Global "Watering Hole"




- Study of Information Theory Fundamentals and Applications to Communications, Computer- and Life-Sciences, Finance, Statistics, and Related Disciplines
- Inaugural Workshop
  - 439 Participants from 21 Countries, 25 Companies, and 84 Universities, Presented 183 Technical Talks
- 40 Faculty, Researchers, Post Doctoral Scholars and Visitors
- Workshops, Short Courses, Seminars



# Cooperative Test Beds Funded by Industry Partners
# Calit2@UCSD's Wireless Power Amplifier Lab

freescale semiconductor

**Power Transistor Tradeoffs**

**Si-LDMOS & GaN**

**Price & Performance**

Eudyna

MOTOROLA

**Power Amplifier Tradeoffs**

**WiMAX & 3GPP LTE**

**Efficiency & Linearity**

NOKIA

ERICSSON

**Digital Signal Processing Tradeoffs**

**Pre-Distortion, Memory Effects & Power Control**

**MIPS & Memory**

QUALCOMM

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# The Two-Campus Calit2 NSF Grant in Responding to Crises and Unexpected Events

- **Long Beach, CA Company Original Subcontractor and Co-PI**
- **Multiple Equipment Donations**
- **Test-Bed Usage for Prototyping and Evaluation**
- **Internships and Training for Students Leading to Employment**
- **Close Alliance with First Responders, to Meet their Specific Needs**



**Calit2 Irvine Engages**

40+ Companies
22 Government Agencies
6 Universities
27 Investigators
70+ students



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rescue *Responding to Crises and Unexpected Events*

# Calit2's CalMesh— Re-establishing Internet Access & Team Communication

- Self-Organizing--Forms a Reliable Wireless Mesh Network
- Creates a Local "Wireless Bubble" 802.11-based WiFi
- Variety of Backhaul Communication Technologies to Connect to Internet
  - Ethernet,
  - 1xEVDO, 1xRTT,
  - WCDMA, UMTS,
  - WiMax
- Supports Data and VoIP-Based Voice Traffic





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# Mushroom Networks: Calit2 Helping Create New Companies

- UCSD Start-up Founded in 2004 by ECE faculty (R. Cruz) and Calit2 Engineer (C. Akin).
  - Now has 25 Employees, Series A Funding
- Ericsson Researcher (R. Mishra)
  - "Lived" at Calit2 One Year
  - Hired by Calit2 One Year
  - Then Moved to Mushroom
- Full Circle: Mushroom and Calit2 Joint Applicants for the Navy's Small Business Technology Transfer (STTR) Funding
- First Product Shipped Feb, 2008: TRUFFLE

mushroom NETWORKS




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# RESCUE Mardi Gras Testbed
# Dress Rehearsal: Feb. 24, 2006



Camera Setup *Photo By Michael Hennig*

## Calmesh Access Point Testing

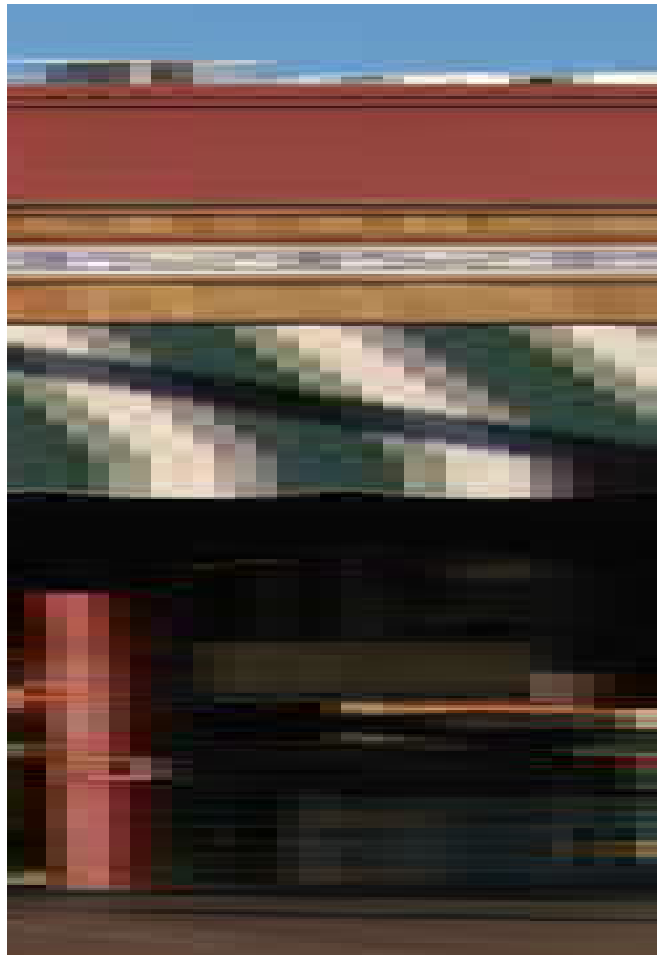




*Photo By Michael Hennig*

Tropos Access Point

## Mushroom Networks, Camera Set-up on Roof



# NSF RESCUE Strongly Coupled with NIH WIISARD Grant

## Wireless Internet Information System for Medical Response in Disasters

## Calit2 is Working Closely with the First Responder Community

**Les Lenert, UCSD PI**



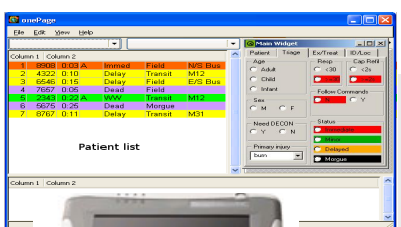




Triage

First Tier





Mid Tier



802.11 pulse ox



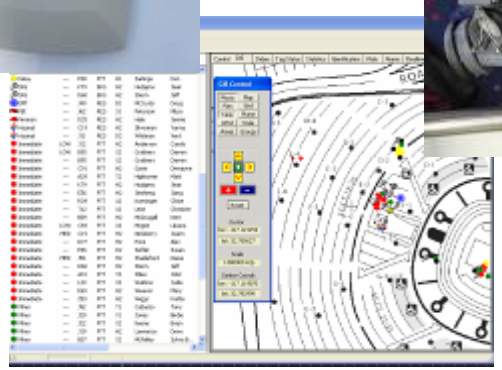




Reality Flythrough
Mobile Video



Wireless Networks



Command Center

A-D Research Foundation

celula™

Nanotrope

nativis
a life sciences company

Parker

Sun microsystems

aguila
Radiation Detectors & Electronic Systems

CUBIC CORPORATION

SYMMUNITY

RF Nano Corporation™

AMCC

FAVRILLE
Cancer treatment—we make it personal

TCZ
A Joint Venture of Cymer and Carl Zeiss SMT

Seashell Technology

freescale™
semiconductor

SAIC
From Science to Solutions

autosplice
INNOVATIVE INTERCONNECTIONS

THE SCRIPPS RESEARCH INSTITUTE

GENERAL ATOMICS
AND AFFILIATED COMPANIES

Separation Systems Technology

ARRAYOMICS

Hi-Z
TECHNOLOGY, INC.

ThermopeutiX

Menon & Associates
Innovation in Sensors

TREX ENTERPRISES
CORPORATION

BD

illumina

L3
communications

SOLASE
photovoltaic technologies

XCOM

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Maxwell
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