ATNS 2023

ADVANCED TECHNOLOGY FOR NATIONAL SECURITY WORKSHOP

11–13 APRIL 2023

- **11 April: Expanding the Microelectronics Ecosystem Workshop**
  Keynote: Dev Shenoy, Principal Director for Microelectronics, OUSD (R&E)
  Keynote: J. Alexander Liddle, Senior Advisor for Program Coordination (interim), CHIPS R&D, DoC
- **12 April: Quantum Platforms and Extended Applications Workshop**
  Keynote: John Burke, Principal Director for Quantum Science, OUSD (R&E) (S&T)
- **13 April: Alternate Avenues for Innovation: Advancing CMOS and Packaging**
  Keynote: Carl McCants, Special Assistant to the DARPA Director, MTO



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LINCOLN LABORATORY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
244 Wood Street ▪ Lexington, Massachusetts 02421-6426

AGENDA – DAY 1

EXPANDING THE MICROELECTRONICS ECOSYSTEM WORKSHOP

TUESDAY, 11 APRIL

0830 Keynote - **Dev Shenoy**, Principal Director for Microelectronics, OUSD (R&E)

0915 Keynote - **J. Alexander Liddle**, Senior Advisor for Program Coordination (interim), CHIPS R&D, DoC

1000 *Break*

University Perspective on Microelectronics Research — *Session Chair:* **Ilya Prigozhin**

1020 New Devices for Analog Deep Learning ..... **Jesus A. del Alamo,** MIT

1040 The Raytheon/UMass Lowell Research Institute (RURI): Developing Printed Electronics through Corporate-Academic Partnerships ..... **Craig Armiento,** UMASS Lowell

1100 An Academic's Perspective on Photodetector Research ..... **Joe Campbell,** UVA

1120 How can Academic Research Enhance US-Based Capabilities in Integrated Electronics and Photonics? ..... **Stephen Ralph,** Georgia Tech

1140 CMOS-MEMS: How your IC Chips can do More for you ..... **Dana Weinstein,** Purdue

1200 *Break*

Lab to Fab Transition — *Session Chair:* **Pascale Gouker**

1320 Superconducting QUbIts at Lincoln Laboratory (SQUILL) Foundry ..... **Cyrus Hirjibehedin,** MIT LL

1340 Manufacturing Innovation Institute Perspectives on the Integrated Photonics Ecosystem ..... **Wade Cook,** AIM Photonics

1400 DoD-Contractor Perspectives on the Microelectronics Ecosystem ..... **Ron Gyurcsik,** Raytheon

1420 Commercial Foundry Perspectives on the Microelectronics Ecosystem ..... **Brad Ferguson,** SkyWater

1440 Sensor Arrays Fabrication Process Transition into Production ..... **Rengarajan Sudharsanan,** Acqubit

1500 *Break*

Creating a More Connected Ecosystem — *Session Chair:* **Rich Younger**

1520 Rapid Assured Microelectronics Prototypes Leveraging Advanced Commercial Capabilities ..... **Matthew Gadlage,** NSWC Crane

1540 System Driven Microelectronics Project Definition ..... **Jonathan Frechette,** MIT LL

1600 Panel Discussion on Creating a More Connected Ecosytem

1700 *Reception with Passed Hors d'Oeuvres*

AGENDA – DAY 2

QUANTUM PLATFORMS AND EXTENDED APPLICATIONS WORKSHOP

WEDNESDAY, 12 APRIL

0900 Keynote - **John Burke**, Principal Director for Quantum Science, OUSD (R&E) (S&T)

1000 *Break*

Superconducting Technology for Classical and Quantum Computation — *Session Chair:* **Cyrus Hirjibehedin**

1020 Enhancing the Performance of Superconducting Qubits — **Kyle Serniak,** MIT LL

1045 Superconducting Quantum processing at LBNL's Advanced Quantum Testbed — **David Santiago,** LBL

1110 Scaling Issues in Superconducting Electronics — **Rory Perkins,** LPS

1135 Post-CMOS Computation with Superconducting Electronics — **Massoud Pedram,** USC

1200 *Break*

Diamond Technologies for Quantum and Power Electronics — *Session Chair:* **Justin Mallek**

1320 Diamond for Magnetic Navigation — **Linh Pham,** MIT LL

1345 Quantum Diamond Sensors- Best of Both Worlds — **Ronald Walsworth,** UMD

1410 Quantum Physics with Single Spins & the Importance of Materials — **Jared D. Rovny,** Princeton

1435 Diamond Platform for Power Electronics — **Dave Meyer,** NRL

1500 *Break*

Integrated Photonics for Quantum and Microwave Systems — *Session Chair:* **Cheri Sorace-Agaskar**

1520 Integrated Photonics Platforms for Quantum and Microwave Photonics at MIT LL — **Dave Kharas,** MIT LL

1545 Thoughts on Integrated Photonics for Air and Missile Defense Systems — **Tom Clark,** JHU APL

1610 Monolithic CMOS-based Electronic-photonic ICs for Quantum and mmWave Applications — **Milos Popovic,** BU

1635 Manufacturable Integrated Quantum Photonics — **Mercedes Gimeno-Segovia,** PsyQuantum

1700 Trapped Ion Quantum Computing and Sensing using Integrated Photonics — **John Chiaverini,** MIT LL

1725 *Adjourn*

AGENDA – DAY 3

ALTERNATE AVENUES FOR INNOVATION: ADVANCING CMOS AND PACKAGING WORKSHOP

THURSDAY, 13 APRIL

0800 Networking Breakfast

0900 Keynote - **Carl McCants**, Special Assistant to the DARPA Director, Microsystems Technology Office (MTO)

1000 *Break*

Advanced Imagers — *Session Chair:* **Dan Sidor**

1020 Next Generation IR FPAs for the Surface Navy — **Ben Conley,** ONR

1045 IR Detector Material Research at MIT LL — **Kyle McNicholas,** MIT LL

1110 Exploiting Advanced Readout Integrated Circuits for Imaging — **Jonathan Leu,** MIT LL

1135 Fast Event-based Neuromorphic Camera and Electronics (FENCE) — **Whitney Mason,** DARPA STO

1200 *Break*

Fiber, Fabric, and other 3D-integrated Electronics — *Session Chair:* **Dan Freeman**

1320 Smart Electrically Powered and Networked Textile Systems (SMART ePANTS) — **Dawson Cagle,** IARPA

1345 Dense Routing for Arrayed Perception Electronics (DRAPE): Developing Effective Textile-Integrated Networks Using Interstitial Design — **Jim Owens,** Nautilus Defense

1410 Wafer Scale Satellite — **Lalitha Parameswaran,** MIT LL

1435 Flexible Electronics — **Scott Miller,** NextFlex

1500 *Break*

Approaches and Technologies for Future FET Scaling — *Session Chair:* **Ryan Keech**

1520 New Materials Systems for Moore's Law Continuation — **Matthew Metz,** Intel

1545 Design and Modeling of Next-Gen High Performance Computing — **Jamil Kawa,** Synopsys

1610 Ferroelectric Devices for Beyond CMOS Computing — **Mohamed Mohamed,** MIT LL

1635 Emerging Nanoelectronic Devices — **Kai Ni,** Rochester Institute of Technology

1700 CMOS Scaling: From 90nm to 45nm on a 200mm Toolset — **Dominick Pipitone,** MIT LL

1725 *Conference Adjourns*

ATNS 2023

ADVANCED TECHNOLOGY FOR NATIONAL SECURITY WORKSHOP 2023

GENERAL INFORMATION

The 2023 Advanced Technology for National Security Workshop Series is a forum for architects of future government systems to understand how new technology can have a profound impact on systems critical to national security. The goal of this workshop is to share new ideas with system architects and advanced technology developers in an interactive meeting to enable future national security systems that will make a difference. Attending this workshop will benefit government technology developers, industry partners, and system integrators. To request an invitation, email ATNS@ll.mit.edu. Space is limited. A preliminary agenda of the workshop program is attached.

SECURITY

This workshop series is restricted to U.S. Persons only. Attendees must also be employees of a U.S. Government Agency or their contractor. All workshop attendees will be required to submit verification of employment by a U.S. Government Agency or complete a Qualified U.S. Contractor & Export Compliance Certification. The required security forms for the workshop will be provided when registering online. Please register early to allow time for the clearance paperwork to be processed by your Security Department.

Badges. There is a 100% picture ID check for badge issuance. Badges are to be picked up at the Security Desk each morning and returned each night before you leave. Badges may not be taken outside of the auditorium area.

Note taking policy. There will be no classified note taking at this workshop.

Personal cameras, including camera/video phones, and recording devices are not permitted in the facility. For further information or assistance regarding security, please see the Security and/or Registration Desk.

Wireless devices/bags. Cell phones, laptops, PEDs (personal electronic devices), and bags (backpacks, pocketbooks, and briefcases) are not permitted in the auditorium. It is recommended that these items are not brought into the Laboratory. If you bring these items into the Laboratory, there will be a location outside of the auditorium to store your belongings.

REGISTRATION PROCESS

- Advance notification of attendance is required. The registration fee is $115 for one day, $230 for two days, and $300 for all three days. Please click here to register.
- The website registration page and agenda page are password protected with the password Canary 2001 (case sensitive).
- The registration deadline is 03 April 2023.
- For information or assistance in registering for the 2023 Advanced Technology for National Security Workshop Series, please call 781-981-9044, or email ATNS@ll.mit.edu.

CANCELLATION POLICY

There is a $25 processing fee for all cancellations, which must be received by email to ATNS@ll.mit.edu no later than 05 April. Refunds for cancellations received by the deadline will be processed approximately two weeks after the event. Substitutions that meet all security requirements are welcome in lieu of cancellations.

RECEPTION

Following the presentations on 11 April, a reception with heavy hors d'oeuvres, and cash bar is planned. Speakers will be available for discussion during this time. On the morning on 13 April, there will be a networking breakfast for all attendees.

TRANSPORTATION

- Transportation will be the responsibility of the attendees.
- The usual taxicab fare from Logan Airport to Lexington is about $85.

ENTRANCE TO THE LABORATORY

MIT Lincoln Laboratory is located on Hanscom Air Force Base. To avoid delays, use the Lincoln Laboratory gate at 244 Wood Street, Lexington, MA. Identification with a photograph will be required.

MESSAGE CENTER

MIT Lincoln Laboratory Operator: 781-981-5500
Workshop Message Center (during workshop only): 781-981-1210
Workshop Fax (during workshop only): 781-981-1222

WEBSITE

More information on the conference can be found at:
https://llevents.ll.mit.edu/atns/

HOTEL INFORMATION

This list of hotels is for informational purposes only and includes a range of hotels, i.e., full service, mid-range, and budget. The publishing of this hotel information does not constitute an endorsement or recommendation by MIT Lincoln Laboratory.

Note: The hotels are ordered according to proximity to the Laboratory; the numbers do not imply any ranking of the hotels' quality, services, or amenities.

Aloft – Lexington
727 Marrett Road – A
Lexington, MA 02421
781-761-1700

Element – Lexington
727 Marrett Road – B
Lexington, MA 02421
781-761-1750

Quality Inn and Suites
440 Bedford Street
Lexington, MA 02420
781-861-0850
781-861-0821 (fax)

Hilton Garden Inn
Boston/Burlington
5 Wheeler Road
Burlington, MA 01803
781-272-8800
781-221-4605 (fax)
800-445-8667 (toll free)

Sonesta
11 Old Concord Road
Burlington, MA 01803
781-221-2233
781-221-6969 (fax)

Hyatt Summerfield Suites 2
Van De Graaff Drive
Burlington, MA 01803
781-270-0800

Boston Marriott Burlington
Routes 95/128 & 3A
1 Burlington Mall Road
Burlington, MA 01803
781-229-6565
781-229-7973 (fax)
800-228-9290 (toll free)

Homestead Studio Suites
40 South Avenue
Burlington, MA 01803
781-359-9099
781-359-9044 (fax)
800-804-3724 (toll free)

Candlewood Suites
130 Middlesex Turnpike
Burlington, MA 01803
781-229-4300

Doubletree Hotel
Boston/Bedford
Glen 44 Middlesex Turnpike
Bedford, MA 01730
781-275-5500
781-275-8956 (fax)
800-205-3006 (toll free)

Hampton Inn
Bedford/Burlington
25 Middlesex Turnpike
Bedford, MA 01821
978-262-9977
978-262-9660 (fax)

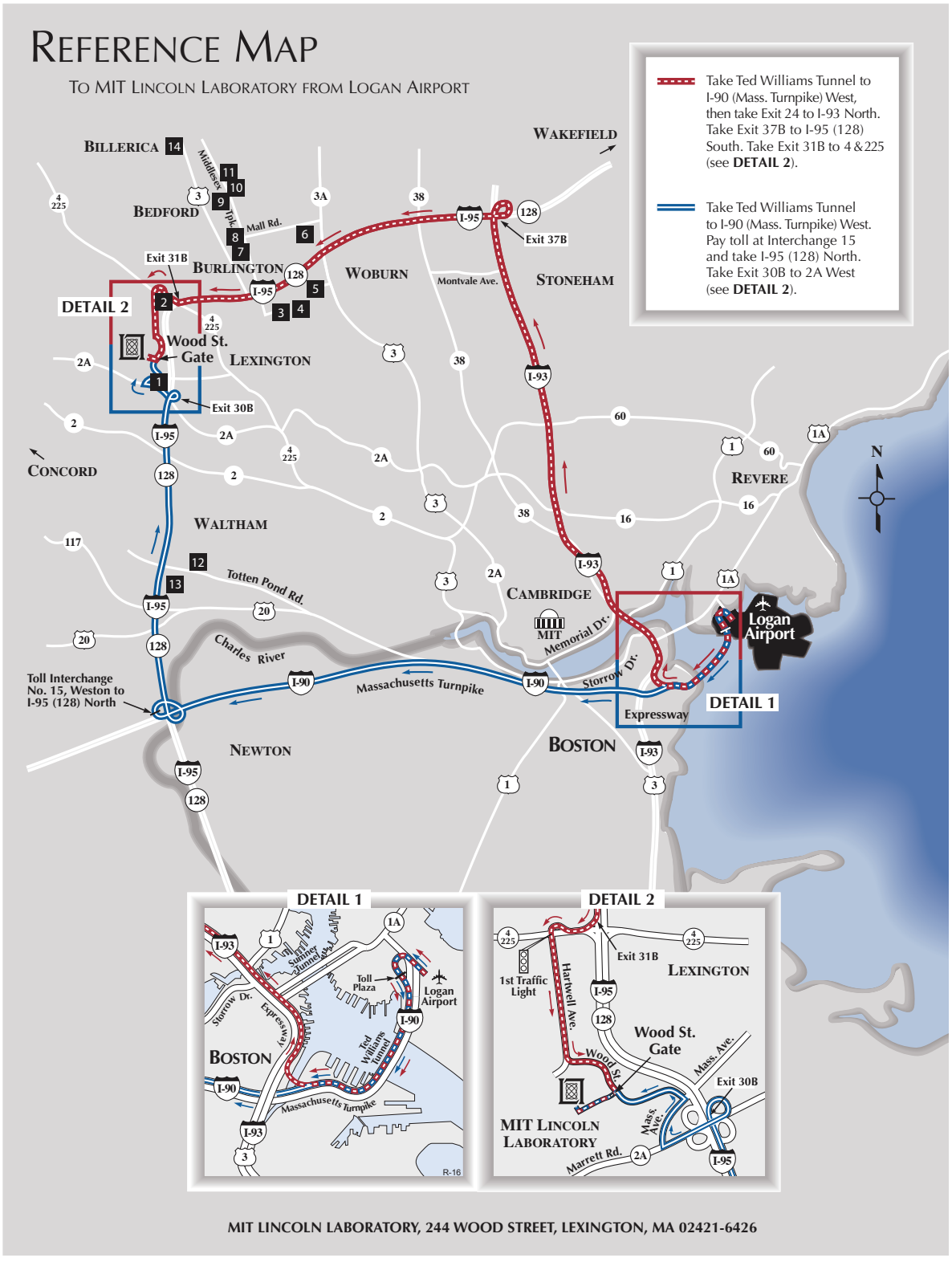
Homewood Suites by Hilton
35 Middlesex Turnpike
Billerica, MA 01821
978-670-7111
978-670-1166 (fax)

Hilton Garden Inn
Boston/Waltham
420 Totten Pond Road
Waltham, MA 02451
781-890-0100
781-890-4446 (fax)
800-445-8667 (toll free)

Westin Hotel
70 Third Avenue
Waltham, MA 02451
781-290-5600
781-290-5626 (fax)

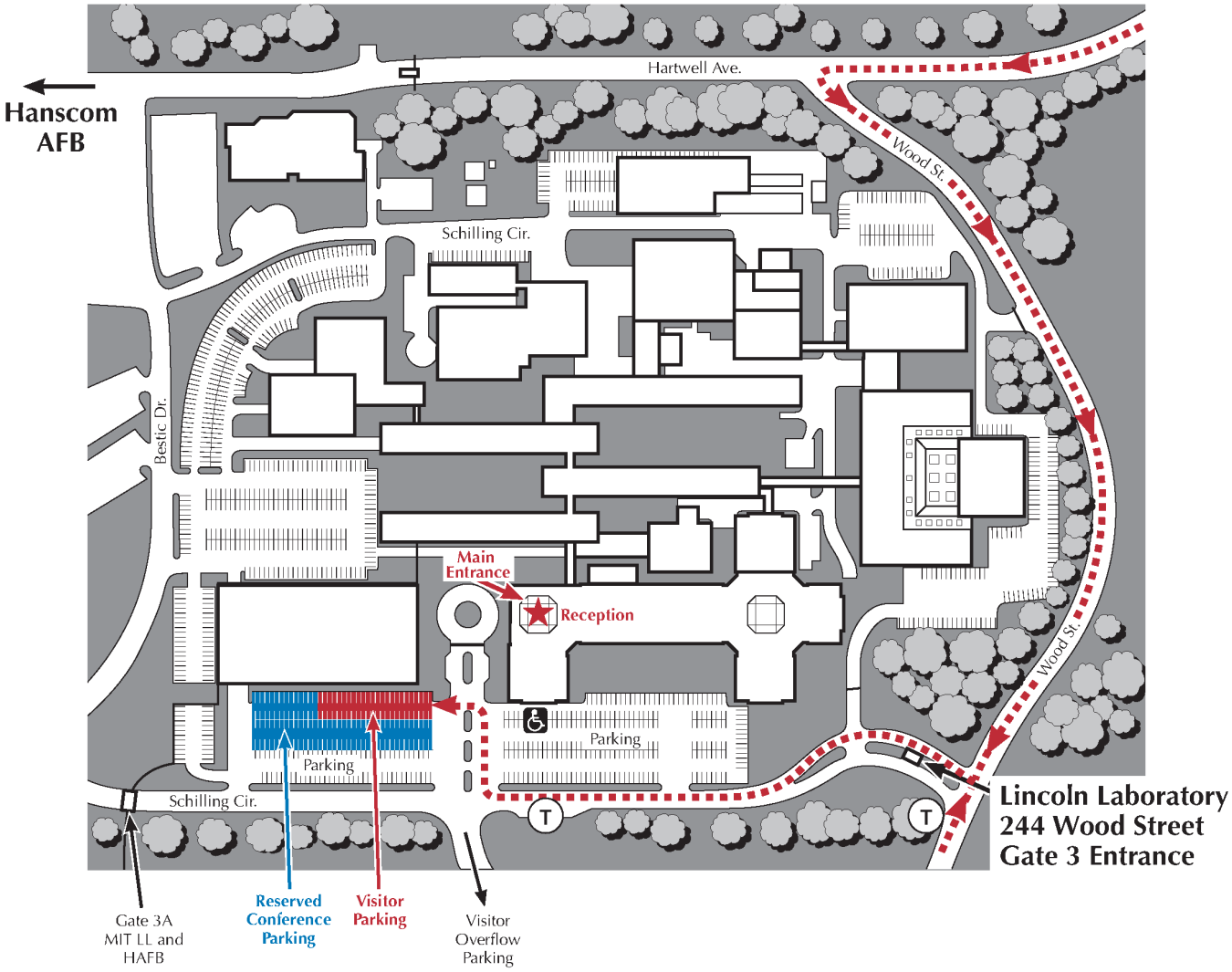
Courtyard by Marriott
Boston/Billerica
270 Concord Road
Billerica, MA 01821
978-670-7500
978-670-8898 (fax)

REFERENCE MAP



MIT LINCOLN LABORATORY, 244 WOOD STREET, LEXINGTON, MA 02421-6426

CONFERENCE PARKING



- Reception; Main Entrance
- Conference Parking
- Visitor Parking
- Accessible Parking
- MBTA Bus Stop