

Mid Atlantic Micro-Nano Alliance Newsletter - Holiday Edition

THE 2010 MANA SYMPOSIUM WAS HELD AT JHU/APL ON OCTOBER 19, 2010.

Thanks to all our speakers and participants! It was a very successful event and we look forward to seeing you next year! The Student Poster Award winner was Mr. Konstantinos Gerasopolous, a student of Professor Reza Ghodssi at the University of Maryland. Congratulations to Konstantinos, receiving his \$1000 cash award from MANA Steering Committee member Dr. Samara Firebaugh, below.



MID ATLANTIC SPOTLIGHT

NASA Goddard – **Detector Development Laboratory**

Greenbelt, Maryland

<http://detectors.gsfc.nasa.gov/DDL>

FACILITY OVERVIEW

The Detector Development Laboratory (DDL), located at NASA's Goddard Space Flight Center in Greenbelt, Maryland, is a 24,000-square-foot, highly advanced, semiconductor fabrication facility, available for use by U.S. companies, universities, and other government agencies for research and development projects. The DDL is ideal for prototyping and developing semiconductor devices, primarily in the MEMS and nanotechnology realms. After extensive safety and tool training, users are allowed access to a toolset that can produce virtually any surface or bulk micro-machined MEMS device. The laboratory houses a 4,000-square-foot, class 10 clean room and a 3,700-square-foot, class 10,000 process equipment service area with extensive equipment, offering unique processing capabilities.

DDL CAPABILITIES

The DDL has all necessary equipment for both bulk and surface micromachining. Coupled with backend processing such as wet and dry release processes and diamond and laser dicing, the DDL can turn bare substrates into singulated and released MEMS devices. For nano-structures, a direct-write e-beam lithography system enables patterning of features < 100 nm in size. Also, nanotube-based devices can be fabricated by using the DDL's nanotube growth furnace. Some of the lab's unique capabilities include a high-energy implanter (up to 1MeV and 1mA), a flip-chip bonder (up to 88 kg-force), a dedicated indium deposition system, a spray resist tool, a dedicated magnetic materials deposition chamber and an atomic layer deposition tool (coming Spring 2011). Along with our unique toolset are the Goddard engineers who have a vast array of knowledge and expertise in micro-fabrication and continually deliver world class devices for NASA missions and the domestic and international communities.

WORLD CLASS HISTORY

The DDL is a part of the Detector Systems Branch at the Goddard Space Flight Center, which builds a wide range of products from single custom detectors to entire instruments for NASA, other government agencies, universities, and industry. These detectors span the entire electromagnetic spectrum from the millimeter to cosmic rays. In addition, the Branch fabricates and tests particle detectors, Micro-Electro-Mechanical-Systems (MEMS) and Nanotechnology

components. Our detectors can be found on NASA's spacecraft, aircraft, balloons and rockets as well as on Earth-based telescopes. We routinely follow a project from the initial concept, through the design, construction and characterization phases all the way to the final implementation of the project. Our people have the expertise to make this possible, with extensive experience in a broad array of disciplines including detector physics, micro-fabrication, detector characterization, and engineering of high performance detector systems. Our major successes include the following:

- X-ray microcalorimeters for Astro-E/Suzuka
- HgCdTe infrared detectors for CIRS/Cassini mission to Saturn
- CdZnTe gamma ray detector technology and time-tagged source for SWIFT/BAT
- First 2-D addressable micro shutter array for James Webb Space Telescope
- Silicon wire bridge chips and polysilicon IR sources for SPITZER Space Telescope
- Largest FIR bolometer array (Atacama Cosmology Telescope)
- Anode arrays for the UVCS and SUMER instruments on SOHO solar observatory
- Low noise cryogenic JFETs for Gravity Probe B
- First largest format GaN UV detector array
- Custom CCDs for GAMS and SAGE for remote sensing
- First 1K x 1K GaAs QWIP array
- LEISA infrared camera for Pluto New Horizons mission

WORKING IN THE DDL

The partnership model for the DDL is that of a users' facility. A company can send personnel to carry out its work alongside Goddard engineers working on NASA projects. A Space Act Agreement (SAA) first must be negotiated and set up, and then all employees who are designated to use the DDL will be provided training in safety and tool usage by lab staff and Goddard engineers.

CONTACT

Process approval and scheduling: Tim Miller, 301-286-4305
(timothy.m.miller@nasa.gov)

Space Act Agreement Information: Ted Mecum, 301-286-2198
(ted.mecum@nasa.gov)

FUNDING OPPORTUNITIES:

- DARPA BAA 11-06, [Advanced Wireless Networks for the Soldier \(AWNS\)](#), FedBizOpps/CBD 3 November 2010.
 - USTRANSCOM HTC711-11-ZS01, [Airship and Hybrid Airship Development, Integration, Operations, and Economic Feasibility](#), FedBizOpps/CBD 8 November 2010.
 - DARPA BAA 11-09, [Near Junction Thermal Transport \(NJTT\)](#), FedBizOpps/CBD 9 November 2010.
 - NAVSEA N6133111QSB01, [Expeditionary Unmanned Undersea Vehicle Neutralization System \(EUNS\)](#), FedBizOpps/CBD 1 November 2010.
- DARPA BAA 11-11, [Advanced X-Ray integrated Sources \(AXiS\)](#), FedBizOpps/CBD 22 November 2010.
 - NSWCDD N0017811Q1902, [Applied Research/Expl Dev Advancement and Improvement of Targeting Systems](#), FedBizOpps/CBD 22 November 2010.
 - DARPA BAA 11-10, [Single Chip Timing and Inertial Measurement Unit \(TIMU\)](#), FedBizOpps/CBD 23 November 2010 Amendment.
 - DARPA BAA 11-22, [Controlling Cellular Machinery - Vaccines](#), FedBizOpps/CBD 29 November 2010.
 - DARPA BAA 11-23, [Controlling Cellular Machinery - Diagnostics and Therapeutics](#), FedBizOpps/CBD 29 November 2010.

LOCAL MEETINGS:

[10th Lightweight Materials for Defense Summit](#)

December 6-8, 2010 Sheraton National Hotel, Arlington, VA

[National Nanotechnology Initiative at 10: Nanotechnology Innovation Summit.](#)

December 8-10, 2010 Gaylord Convention Center, Washington DC

AWARDS, FELLOWSHIPS & GRANTS:

[Nanoelectronics for 2020 and Beyond \(NEB\) A Joint Activity between NSF and NRI](#) - The National Science Foundation (NSF), through its Directorates for Engineering, Mathematical and Physical Sciences, and Computer & Information Science & Engineering, together with the semiconductor industry's Nanoelectronics Research Initiative (NRI) plan to jointly support innovative research and education activities on the topic of Nanoelectronics for 2020 and Beyond (NEB). These activities will be supported as interdisciplinary research team awards.

[WISE 2011 Internships](#) - Apply for WISE 2011 - The application period for the summer 2011 program is open. All application forms for all of the sponsoring societies are available online. The deadline for 2011 applications is 31 December 2010.

[IEEE-USA 2012 Government Fellowships](#) - Each year, IEEE-USA sponsors three government fellowships for qualified IEEE members. The fellows - chosen by the IEEE-USA Government Fellows Committee and confirmed by the Board - spend a year in Washington serving as advisers to the U.S. Congress and to key U.S. Department of State decision-makers. Known as either a Congressional Fellowship or an Engineering & Diplomacy Fellowship, this program links science, technology and engineering professionals with government, and provides a mechanism for IEEE's U.S. members to learn firsthand about the public policy process while imparting their knowledge and experience to policymakers. 2012 Application materials are now available. Deadline is 18 March 2011.

[Department of Energy \(DOE\) Scholars Program](#) is now accepting applications for Summer 2011. The program offers summer internships with stipends of up to \$650 per week depending on academic status to undergraduates, graduate students and post graduates at accredited institutes of higher education. Majors accepted include: engineering; physical sciences; environmental sciences; computer science and information technology; physics; program management; math; statistics; safety and health; accounting and finance; law; and other related discipline areas. The deadline is January 31, 2011.

EMPLOYMENT OPPORTUNITIES:

[CHECK OUT THE MID ATLANTIC MICRO/NANO ALLIANCE JOB BOARD FOR THE LATEST JOB POSTINGS!!](#)

Wireless Embedded Systems Engineer

Job Description: A highly motivated and versatile electrical engineer with a strong background in electronic circuits and embedded systems for full-time employment in the Baltimore/Washington DC area. You will be responsible for designing and developing hardware and firmware for miniaturized, low power wireless systems for biomedical and environmental sensing applications.

Experience: The position requires demonstrated experience implementing ZigBee, Bluetooth, and/or other wireless technologies for telemetry applications. Applicant should also have experience with instrumentation design, analog circuit design, and microcontroller coding. Some experience with FPGA and DSPs is a plus, as is experience with low power circuits and energy scavenging. Most project work will involve discrete component design, but experience with ASICs is a plus. Exposure to and experience in MEMS/Microsystems is also plus. This is a hands-on job; applicant will be involved in all aspects of product lifecycle: requirements gathering, design, fabrication, and test.

Education: Candidates with a B.S., M.S., or Ph.D are all encouraged to apply.

SB Microsystems is a contract Research and Development firm specializing in miniature, low power systems and sensors for biomedical applications, laboratory analytics and environmental sensing. Our clients include medical and consumer device start-ups, private and governmental research foundations, and large technology companies.

Please send resume to Brian Barbarits at barbarits@sbmicrosystems.us

OPPORTUNITIES SOUGHT:

Results oriented professional engineer possessing over 20 years progressive experience in the development of silicon-based sensor arrays used on multiple satellite, sounding rockets, and earth based programs. Currently a group Lead Process Engineer in support of space exploration programs at the NASA/Goddard Space Flight Center (GSFC). Directly support NASA scientists by generating unique fabrication techniques required for the development of MEMS technologies. Responsible for the fabrication and integration of sensor arrays which operated successfully in space. Possess strong skills in task evaluation and have the ability to quickly identify the resources (equipment, duration, funding) necessary to accomplish complex tasks on time and within budget. Excellent oral and written communications skills coupled with extensive Microsoft Office experience permit the presentation of reports and briefings. Published multiple technical articles and presented findings on fabrication techniques used by NASA for improving silicon X-ray microcalorimeter arrays at the Low Temperature Detectors Conference in Milan, Italy. Contact Regis Brekosky: mrbrekosky@comcast.net

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