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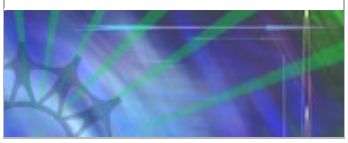

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Award Abstract #0946458

MIRTHE Industry Experts in Packaging

NSF Org:	EEC Div Of Engineering Education and Centers
Initial Amendment Date:	August 24, 2009
Latest Amendment Date:	February 19, 2010
Award Number:	0946458
Award Instrument:	Standard Grant
Program Manager:	Deborah Jackson EEC Div Of Engineering Education and Centers ENG Directorate For Engineering
Start Date:	January 1, 2010
End Date:	December 31, 2013 (Estimated)
Awarded Amount to Date:	$859,506.00
Investigator(s):	Claire Gmachl cgmachl@princeton.edu (Principal Investigator)
Sponsor:	Princeton University Off. of Research & Proj. Admin. Princeton, NJ 08544-2020 (609)258-3090
NSF Program(s):	EEC Innovation Awards
Program Reference Code(s):	0000, 128E, 130E, 1480, 7960, OTHR
Program Element Code(s):	7960

ABSTRACT

MIRTHE Industry Experts in Packaging

We here propose to appoint to MIRTHE, the NSF-sponsored Engineering Research Center for Mid-InfraRed Technologies for Health and Environment, a small group of industrially experienced researchers, MIRTHE Industry Experts in Packaging, to assist MIRTHE in establishing cost-effective, reliable, and state-of-the-art packaging capabilities for its foundational research work on high performance Quantum Cascade lasers, laser sub-systems, and sensors. A lack of such packaging capabilities was previously cited as a weakness or potential threat to MIRTHE by NSF site review panels. This proposal opportunity allows us to rapidly establish this much needed packaging capabilities on-site in MIRTHE's shared facilities under the guidance of experienced industry experts. We have selected industry experts who in addition to top-quality technical expertise also bring with them expertise in starting up companies, working in highly successful small businesses,

and who have experience in working with graduate and undergraduate students. The proposed work matches well with all three of MIRTHE's pillars: it will bring much-needed expertise in device packaging to MIRTHE's R&D efforts; it helps fulfill MIRTHE's education mission in training students and returning students in the STEM fields; and it strengthens MIRTHE's industry,university ties. In addition to hiring two part-time senior industry experts in packaging for the duration of three years, we also propose to hire a very small group of recently laid off junior engineers who are transitioning from industry back to graduate school.

Intellectual merit.

The NSF-sponsored Engineering Research Center MIRTHE is leading the development of an entirely new platform of trace gas sensor systems that provide high-performance, cost-effective, and networked sensing capabilities. These sensor systems are based on mid-infrared Quantum Cascade laser spectroscopy and excel through their compactness, autonomy, networking capability, and fast time response. They fulfill the application requirements of trace chemical sensing on the individual point sensor, urban sensor network, remote sensor, and regional scale. In doing so, MIRTHE has been addressing and continues to address the important societal challenges of securing a clean, safe, sustainable, and healthy environment, clean air to breathe and accessible healthcare.

The here proposed "MIRTHE Industry Experts in Packaging" program appoints particularly qualified and highly motivated experts from industry to develop MIRTHE's device packaging capabilities which will greatly enhance and speed up MIRTHE's research and development at the device and sub-systems level. In turn, MIRTHE will be better able to deliver on its research and development mission and vision.

Broader impacts

MIRTHE successfully trains and graduates a diverse and globally competitive U.S. workforce ready to assume engineering leadership for the 21st century. MIRTHE has a proven track record to reach out to groups historically underrepresented in science and engineering, and its researcher and student diversity consistently exceeds comparable national averages. In collaboration with its industrial/practitioner partners, MIRTHE has developed and continues to develop prototypes of cost-effective, market-ready, mid-infrared sensing technologies; these technologies result in new profitable product lines and new revenue streams for important industry sectors.

In the here proposed ,MIRTHE Industry Experts in Packaging? program, students and post-doctoral researchers will work closely with industry experts on the development of the commercially important packaging capabilities. Students and post-docs will be trained in a previously unavailable yet necessary skill (packaging), and will be offered first-hand insight into the effort of starting up a company and of working in small businesses.

Hiring of recently laid-off junior engineers transitioning from industry to graduate school provides a unique opportunity to retain talent in the STEM fields and to increase the diversity of MIRTHE's student pool.

Needless to add, MIRTHE's shared facilities will gain greatly from the addition of a cost-effective, reliable, state-of-the-art packaging facility

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