

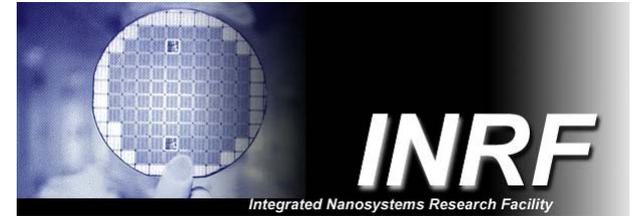
# Acquisition of An Electron-beam Lithography System for a Nanotechnology Research and Education Facility at U.C. Irvine

*Peter Burke, G.P. Li, Wilson Ho, A. P. Lee, R. Penner, U.C. Irvine DMR-0216635*

## Research:

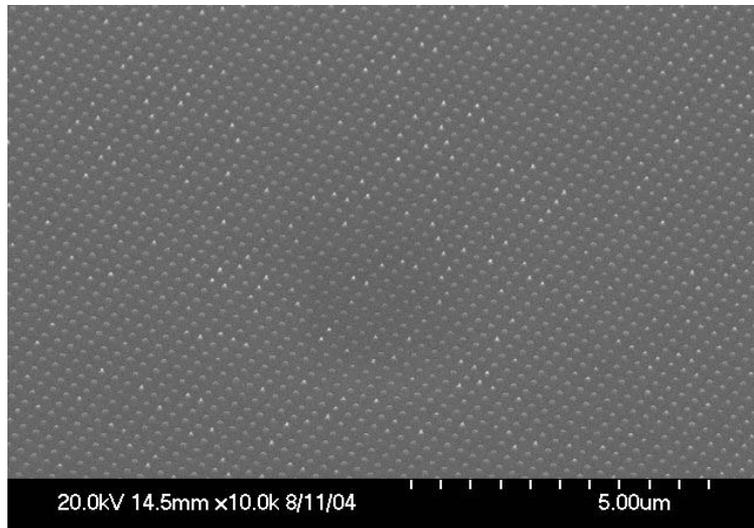
The acquisition of electron beam lithography with support from the NSF MRI program has dramatically enhanced research opportunities in four thrust areas ongoing at U.C. Irvine:

- (1) Wireless communications
- (2) Fiber optic communications
- (3) Biotechnology
- (4) Nanotechnology



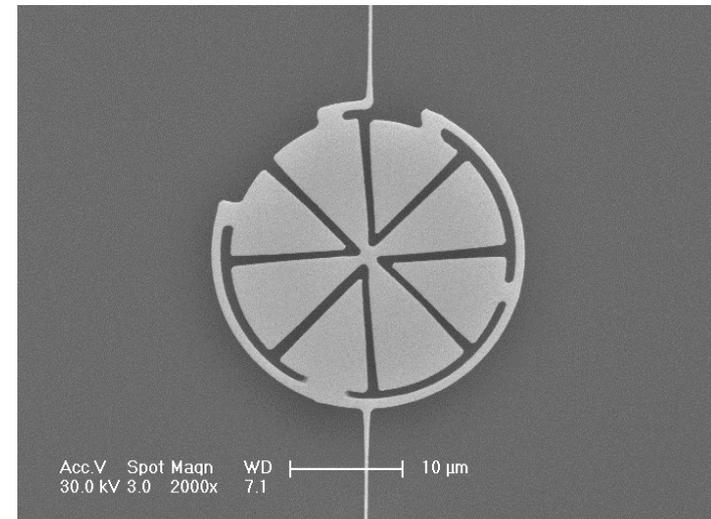
## Examples:

### Integration of Nanotechnology and Biotechnology



Work of student Wei Wei in Professor G.P. Li/Mack Machman's group: This picture shows 50 nm dots. These dots will be used in adhesion studies of proteins. Different adhesion phenomena are expected in surfaces with engineered radius of curvature comparable to the protein diameters.

### Nanotechnology and Wireless Communications



Work of student Yanni (Le Yan) in Professor Bill Tang's group: This picture shows the central portion of a GHz resonator. The nano suspending beams are a key factor to minimize energy dissipation.

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## Education:

•The users of the electron-beam lithography system are **14 graduate students** from **6 professors**.

•**One full-time PhD technician**, (Dr. Qingzhou Xu) supported by University of California, maintains and operates the electron-beam lithography machine, and trains students on its operation and principles.

•**Over 100 faculty, students, postdocs, and industry** users use the *Integrated Nanosystems Research Facility (INRF)* cleanroom, of which the NSF funded electron-beam lithography system is an integral component.

•**Over 25 companies** work inside the INRF; students work literally side-by-side with industry partners, training the next generation of scientists and engineers.



Pictured student users (from left to right):

- Yan Le (advisor Professor W.C. Tang, Biomedical Engineering)
- Jenny (Zhen) Yu (advisor Professor Burke, Electrical Engineering)
- Hong Zhou (advisor Professor Madou, Mechanical Engineering)
- Ko-Sheng Ma (advisor Professor Madou, Mechanical Engineering)
- Lifeng Zheng (advisor Professor Burke, Electrical Engineering)

Not shown:

- Dawei Wang (advisor Prof. J.G. Lu, Materials Science)
- Zhiyong Fan (advisor Prof. J.G. Lu, Materials Science)
- Derek Kingrey (advisor Prof. Phil Collins, Physics)
- Wei Wei (advisor Prof. G.P. Li, Electrical Engineering)
- Haroon Lais (advisor Prof. Tang, Biomedical Engineering)
- Sheng Fen Yen (advisor Prof. Tang, Biomedical Engineering)
- Shengdong Li (advisor Prof. Burke, Electrical Engineering)
- Sungmu Kang (advisor Prof. Burke, Electrical Engineering)
- Tsung-Hsi Hseh (advisor Professor Madou, Mechanical Engineering)
- ChunLei Wang (advisor Professor Madou, Mechanical Engineering)