

**Micro Nano Breakthrough Conference
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Summary of Electronics Focus Group Discussion

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Flip Chart Notes

Examples of Collaborative Mechanisms Involving research institutions and businesses:

NSF GOALI grants (5% co-funding contribution, which could be in the form of student internships)

Other federal research grants/centers (e.g. NSF ERCs)

NASA, DARPA solicitations (e.g. upcoming Human and Robotic Space Exploration program)

SBIR and STTR awards

Student Internships (ed. comment - a really good thing for everyone)

Problems/Opportunities:

IC "hot spot" cooling solutions

Non-destructive nanoscale analysis

Molecular dynamics simulations, usability thereof

Low cost micropumps for microchannel heat exchangers

Mechanical handling/manipulation/placement of nanostructures; virtual reality tools

Organization/self-assembly of nanostructures/nanomaterials

Electronic/photonic integration

Micro to nano interconnect

Roadmap and usage guidelines for nanomaterials

Modeling of nanoscale devices - electrical, mechanical, and thermal

Funding opportunities for microfluidics

Collaboration methods..avoid IP hangups

STM tips - high yield, low cost

Standards to enable repeatable results

Opportunities/Needs Organized Around Nanostructured Materials

Chip cooling (e.g. heat spreading material)

Analytical equipment

Functional devices (e.g. MRAM, embedded passives)

Interconnect

Surface characterization and texturing

Mechanical/structural robustness (e.g. against thermally induced stress)

3D system design tools

Multi-level system modeling, linked simulations

Ready-Aim-Fire or Ready-Fire-Aim?

Another way to look at breakthrough discovery, development, delivery:

1. Bold experimentation
2. Characterization
3. Process Control