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# **Industry/Academia Collaboration for Manufacturing R&D**

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- u Effective funding from low margin companies vs traditional OEMs
  - u Duplication of university equipment/ projects
  - u Reasonable momentum on interconnect, packaging reliability, optronics, etc.
  - u Less focus on advanced logistics/ supply chain
  - u Industry luring away current & potential faculty, ie “eating the seed corn”
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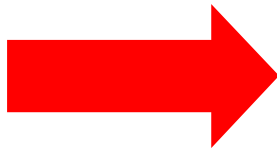
- u Increased industry/ university cooperation
  - u Increased inter-university cooperation (at least in Canada)
  - u 5 year demand (Cdn) for our sector is >30k students/year vs 10k supply
  - u Global EMS companies starting to play a more active role
  - u Charitable giving becoming a status symbol?
  - u Company & individual sponsored
    - ◆ scholarships
    - ◆ endowed chairs
    - ◆ institutes
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CELESTICA™

Trends in Industry Sponsored MFG Technology R&D

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- u Advisory Committees eg. MIT, Queens, ADMI, etc
  - u Celestica UK leveraged \$2.4M R&D with 34 researchers at 25 universities
  - u Equipment donations
  - u Student internship programs (> 200 EE's/ yr in Toronto)
  - u Scholarships/ Chairs
  - u Sponsored post grad degrees
  - u Founding member of institutes/organizations eg: CMAP, ADMI, eMPOWR
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- u Accredited Masters program in design, manufacturing, management
  - u 10 design/ manufacturing technical courses
  - u 10 business and management courses
  - u Unique cooperation between
    - ◆ 4 Canadian Universities
    - ◆ Engineering & Business Schools
  - u Leveraging the 4 universities
    - u common admission requirements
    - u courses credited at any of the 4 universities
    - u joint marketing of courses
    - u joint library privileges
  - u Industry initiators: Celestica, Babcocks & Wilcox, Gennum
  - u Executive Director, David Heaslip, 905-855-9787
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## Center for Microelectronics Assembly & Packaging

- u Building on the skills of 4 Universities, 1 Community College & 5 companies
  - u Celestica & Newbridge (Alcatel) initiated
  - u \$12M initial funding over 5 years, 20 researchers, 10 projects
  - u Leveraged industry & government funding (approx 10:1)
  - u Focus
    - ◆ device packaging, PWB fab & assembly
    - ◆ electrical design & modeling
    - ◆ material development & evaluation
    - ◆ reliability/ failure mechanisms
    - ◆ optronics
  - u Laura Turbini, Executive Director , 416-946-7329
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## Eating the Seed Corn/ The Faculty Shortage

- ◆ Industry led, not for profit organization (17 universities, 10 companies)
  - ◆ Proposing 1 time \$500M federal government grant
  - ◆ Build capacity of HQP in Canadian universities, specifically in Microelectronics, Photonics, Opto-electronics, Wireless & Radio (eMPOWER)
  - ◆ University & college profs are the source of highly qualified people (HQP)
  - ◆ eMPOWER industry to grow 22%pa over next 5 years ie 46K HQP demand
  - ◆ 27% of senior (Cdn) faculty expected to go or retire by 2005
  - ◆ 2005 university capacity, at current course < 10K/ year supply
  - ◆ Over 80% of companies surveyed believe revenue growth exposed by 50%
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- u Excellent opportunity to forge student/company/university link during undergrad years
  - u Most Canadian engineering universities
  - u Extending to community colleges
  - u Not a traditional 4-8 month co-op
  - u 16 month term (including 4 month overlap)
  - u Allows increased job responsibility/accountability, ie a “real job”
  - u Celestica Toronto employs >200/ year
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- u An innovative, not for profit, national Canadian organization
  - u Focused on encouraging youth to enter maths & sciences
  - u Use hands-on, in-class & summer workshops to stimulate interest
  - u Have staff of 800 university students
  - u Reached >200k students (aged 6-17) last year
  - u Includes male, female, aboriginals, remote & underprivileged youth
  - u Received Michael Smith Award for Science & Technology Promotion
  - u Celestica sponsored for last 5 years (pioneered by HP & Shell)
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- u Data/ survey to evaluate severity of the funding problem
  - u Establish a multi-US university internship program (not a 4-8 month co-op)
  - u Packaging, etc needs to be established as a 4th year option
  - u Supply chain/ advanced logistics focus?
  - u Encourage hardware/ manufacturing careers at high school level
  - u Increased press coverage on individual/group donations
  - u Dramatically increase supply of faculty in relevant sectors
  - u Interactive internet based learning?
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