Doctoral Pipeline Issue
Concerns:
Availability of S&E doctorates
   i) NSF studies
   ii) Dick Atkinson report
   iii) Bowen-Salsa report
   ...demographics
   ...retirements
Particularly acute in engineering
Over the next two decades, PhD replacement needs will
double in all sectors (academic, industry, government)
25% of engineering faculty will retire in next 6 years
On the basis of BS production alone, PhD production will
decline by 20% in the decade after the mid-1990s.
Further, in many fields (engineering, mathematics,
physical sciences), foreign student now comprise
more than 50% of awarded degrees...
and while exceptionally talented, this dependence on
foreign human capital puts us at some risk...just as
does our dependence on foreign financial capital...
The PhD production rate simply cannot respond quickly to market signals.
Note that the PhD recipients of 2000 are already in college.
Must focus on currently enrolled college students to affect
PhD shortfall in late 1990s.

Time scales:
i) long-term:
   rebuilding the pipeline
   K-12 education
   minorities, women
ii) intermediate term:
   plug the leaks
   undergraduate S&E education
iii) near term--1990s
   focus on graduate education
NSB EHR Committee
On the 1990s timescale, the most effective way
to deal with the problem is through a major
increase in the available of graduate
fellowships/traineeships
More specifically, it was felt unanimously by EHR
...and supported by the full NSB
that a major traineeship program, patterned after
the NIH program, designed for U.S. citizens
was the most effective way to go.
Note: Here, “traineeship” means that the grants
would be made to institutions rather than
individuals, thereby taking better advantage of
the existing capacity of the academic enterprise
These would be particularly effective for Engineering...
...but also of value in other sciences
NSB Budget Request
i) $25 M for traineeship program in FY92,
growing to $125 M over five years
ii) $25 K per traineeship...hence 1,000 new starts,
building to 5,000 in pipeline at any time
iii) roughly comparable to NSF fellowship program
Convergence of views
i) Mettler/Sample proposal
   Engineering traineeships
   Essentially same as NSF...
Gained support of
ii) AAU, NASULGC proposals
iii) Atkinson proposals
iv) FCCSET proposals

FY92: $150 for S&E traineeships
NSF: $25* --> $50 M
DOE: $25 --> $40 M
NASA: $25 --> $50 M
NIH: $300 --> $350 M
DOD: $50 --> $100 M

v) Other groups
...a number of leaders of industry and education

Where do we stand?

i) While OMB has expressed basic support for NSF, they have deferred action at this time, in part, because the NSF Fellowship program is already receiving a $45 M catchup this year.
ii) Since NSF is the lead agency in the broader FCCSET program, when it was deferred, so too were the efforts in other agencies
iii) Hence effort is being redirected toward the Hill, to seek additional funds “outside the envelope” to get the traineeship program added in.
iv) The NSB EHR Committee will go on record...once again...that it believes that the traineeship program is clearly the most effective way to deal with the coming shortfall on the necessary time schedule

Coretech Effort

Consensus proposal:

i) major research federal agencies each ought to provide a base level of graduate fellowship/traineeship support to maintain future S&E workforce
ii) agency “S&T megaprojects” ought to incorporate within their budgets additional support for fellowships/traineeships since these projects are major users of scientific and technical workforce.

Overall goal: An additional 12,000 graduate students...Ramping up at 3,000 new students per year
Steady-state cost of about $300 million
(Close to FCCSET proposal)

Will work directly through Congress for FY92
...NSF: Add $25 M for traineeship program
...DOD: make special $50 M increment Congress added to FY91 budget part of annual base, and part of this directed to S&E graduate effort
...NASA: looking for $25 M from refocused NASA (Augustine report)
...and $25 M from redesigned space station
...DOE: Both a base program and something as part of SSC
...NIH: Some ramping up of traineeships following Bloom report from IOM

Final Comments

Again, I represent an increasingly common viewpoint that a major expansion in graduate S&E fellowships/traineeships is the most effective way to deal with a urgent problem for the late 1990s...the availability of doctoral level scientists and engineers

An unusual coalition is coming together...from higher education, industry, government...to make the case for this initiative.
We haven’t won the war yet...but you can be certain and more and more folks are going to be pushing on this.
The Manufacturing Forum’s support would be greatly appreciated.