**GEN-1 SYSTEMS GOALS**

The six ERCs in the inaugural Class of 1985 had for their research programs the following systems goals:

* **Engineering Center for Telecommunications Research,** Columbia University—Telecommunications systems to integrate voice, data, video, and communications traffic.[[1]](#footnote-1)
* **Center for Composites Manufacturing Science and Engineering,** University of Delaware and Rutgers University—Composites manufacturing systems.[[2]](#footnote-2)
* **The Systems Research Center,** University of Maryland—Software systems to guide engineers in the design of automation and information-processing systems.[[3]](#footnote-3)
* **Bioprocess Engineering Center,** Massachusetts Institute of Technology—Protein synthesis; bioreactor design, scale-up, and operation; and downstream processing systems for mammalian cell based product isolation and purification.[[4]](#footnote-4)
* **Center for Intelligent Manufacturing Systems,** Purdue University—Next-generation, fully integrated, flexible, self-adaptive computer controlled systems for factory operations from product concept through delivery. [[5]](#footnote-5)
* **Center for Robotic Systems in Microelectronics,** University of Santa Barbara—Robotic systems for material transfer, process control, assembly and packaging. [[6]](#footnote-6)

The research programs of the five ERCs in the Class of 1986 had the following systems goals:

* **Advanced Combustion Engineering Research Center**, Brigham Young University and the University of Utah—Comprehensive state-of-the art computer models for simulation, design and optimization of advanced combustion processes for clean and efficient fossil fuel processing systems.[[7]](#footnote-7)
* **Engineering Design Research Center**, Carnegie Mellon University—Concepts, methods, and design technologies to design better and less expensive products through reduced design cycle times and increases in product aspects.[[8]](#footnote-8)
* **Engineering Research Center for Compound Semiconductor Microelectronics,**University of Illinois, Urbana/Champaign—High-speed, high-density digital systems to solve interconnect problems that are barriers to advancing photonic and optoelectronic communications technologies[[9]](#footnote-9)
* **Center for Advanced Technology for Large Structural Systems,** Lehigh University— New materials, fabrication processes, sensing systems, and computer-based tools for design, fabrication, and life-cycle monitoring of large-scale structural systems.[[10]](#footnote-10)
* **Engineering Research Center for Net Shape Manufacturing**, Ohio State University—Manufacture of discrete part to net (assembly ready) or near-net dimensions through die casting, billet forming, sheet forming, polymer processing, and die/mold manufacturing systems.[[11]](#footnote-11)

The research programs of the three ERCs in the Class of 1987 had the following systems goals:

* **ERC for Emerging Cardiovascular Technologies**, Duke University and other North Carolina Universities—New generation of cardiac interventional and medical imaging systems.[[12]](#footnote-12)
* **ERC for Hazardous Substance Control*,*** University of California, Los Angeles***—***Minimization of hazardous substances generation from their origin in a manufacturing process through their treatment, eventual disposal, possible release from containment, transport and transformation in the environment, and the eventual exposure of humans, animals, or plants to these toxins. [[13]](#footnote-13)
* **Optoelectronic Computing Systems,**University of Colorado and Colorado State University—Creating optoelectronic devices and systems for computing signal processing and artificial intelligence. [[14]](#footnote-14)

The research programs of the four ERCs in the Class of 1988-89 had the following systems goals:

* **ERC for Interfacial Engineering*,*** University of Minnesota–Processing systems to manufacture products whose properties are dominated by interfacial behavior.
* **Center for Advanced Electronic Materials Processing*,*** North Carolina State University - Low thermal budget, in situ, automated single wafer atomic layer electronic material processing technology systems.[[15]](#footnote-15)
* **Offshore Technology Research**—New technology for deep sea oil and gas drilling systems.[[16]](#footnote-16)
* **ERC for Plasma-Aided Processing***,* University of Wisconsin and the University of Minnesota–Plasma-aided manufacturing systems for producing new materials with unusual and superior properties, for developing new chemical compounds and processes, for machining, and for altering and refining materials and surfaces.[[17]](#footnote-17)

Finally, the research programs of the three ERCs in the Class of 1990 had the following systems goals:

* **Data Storage Systems Center,**Carnegie Mellon University—Accelerate the rate of progress in data storage device density and performance through a systems perspective.[[18]](#footnote-18)
* **Center for Computational Field Simulation,** Mississippi State University—Computational simulation systems for simulation and solution of geometrically complex, large-scale physical field problems for engineering design and applications.[[19]](#footnote-19)
* **Center for Biofilm Engineering**, Montana State University—Analysis of microbial phenomena (biofilms) on surfaces and interfaces to inform the development processing systems to control and eliminate biofilms[[20]](#footnote-20)

1. National Research Council (1986). *The New Engineering Research Centers: Purposes, Goals, and Expectations*. Cross-Disciplinary Engineering Research Committee, summary of a symposium, April 29-30, 1985, Washington, D.C.: National Academy Press, p. 100. [https://doi.org/10.17226/616] [↑](#footnote-ref-1)
2. Ibid., p. 93. [↑](#footnote-ref-2)
3. Ibid., p. 63. [↑](#footnote-ref-3)
4. Ibid., p. 114. [↑](#footnote-ref-4)
5. Ibid., p. 75. [↑](#footnote-ref-5)
6. Ibid., p. 86. [↑](#footnote-ref-6)
7. http://grantome.com/grant/NSF/EEC-8522618 [↑](#footnote-ref-7)
8. http://grantome.com/grant/NSF/EEC-8522616 [↑](#footnote-ref-8)
9. http://grantome.com/grant/NSF/EEC-8522666 [↑](#footnote-ref-9)
10. http://grantome.com/grant/NSF/EEC-8522625 [↑](#footnote-ref-10)
11. https://ercnsm.osu.edu/NSF/EEC- 8522662 [↑](#footnote-ref-11)
12. http://grantome.com/grant/NSF/EEC-8622201 [↑](#footnote-ref-12)
13. http://grantome.com/grant/NSF/EEC-8622184 [↑](#footnote-ref-13)
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15. http://grantome.com/grant/NSF/EEC-8721505 [↑](#footnote-ref-15)
16. http://grantome.com/grant/NSF/EEC-8721512 [↑](#footnote-ref-16)
17. Shoet, J. Leon, [Plasma-aided manufacturing - IEEE Journals & Magazine - IEEE Xplore](http://ieeexplore.ieee.org/document/108405/), ieeexplore.ieee.org/document/108405. [↑](#footnote-ref-17)
18. http://grantome.com/grant/NSF/EEC-8907068. [↑](#footnote-ref-18)
19. http://grantome.com/grant/NSF/EEC-8907070. [↑](#footnote-ref-19)
20. http://grantome.com/grant/NSF/EEC-8907039. [↑](#footnote-ref-20)