

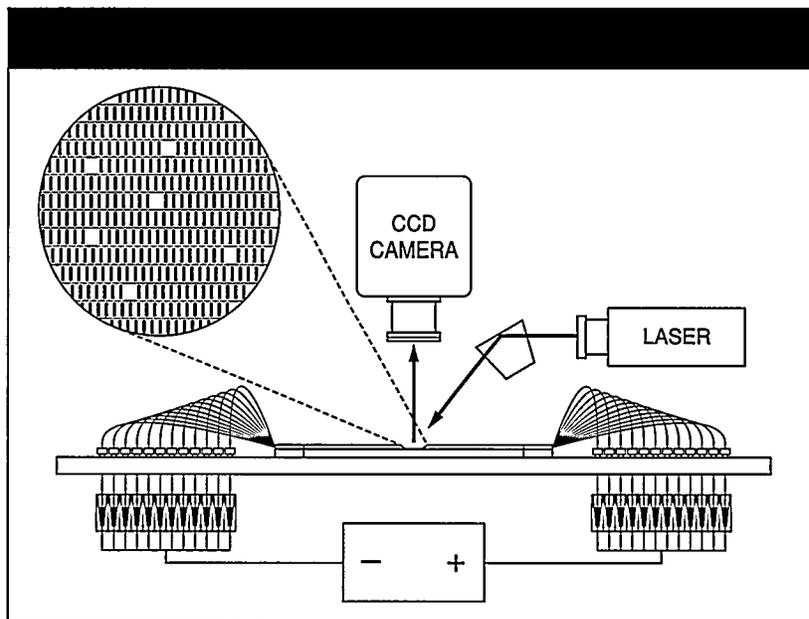
licensed sales and distribution to LTI and, later, production rights as well. LTI operates production centers in the United States, Europe, and Japan.

- The GRAIL-genQuest sequence-analysis software developed at ORNL was licensed by Martin Marietta Energy Systems (now Lockheed Martin Energy Research) to ApoCom, Inc., for pharmaceutical and biotechnology company researchers who cannot use the Internet because of data-security concerns. The public GRAIL-genQuest service remains freely available on the Internet (see box, p. 17).
- In 1995, an exclusive license was granted to U.S. Biochemical Corporation for a genetically engineered, heat-stable, DNA-replicating enzyme with much-improved sequencing properties. The enzyme was developed by Stanley Tabor at Harvard University Medical School.
- In 1995, an advanced capillary array electrophoresis system for sequencing DNA was patented by Iowa State University. The system was licensed to Premier American Technologies Corporation for commercialization (see graphic at right and R&D 100 Awards, next page).
- In 1996, a patent was granted to LANL researchers for DNA fragment sizing and sorting by laser-induced fluorescence. An exclusive license was awarded to Molecular Technology, Inc., for commercialization of the single-molecule detection capability related to DNA sizing (see R&D 100 Awards, next page).

SBIR and STTR

Small Business Innovation Research (SBIR) Program awards are designed to stimulate commercialization of new technology for the benefit of both the private and public sectors. The highly competitive program emphasizes

cutting-edge, high-risk research with potential for high payoff in different areas, including human genome research. Small business firms with fewer than 500 employees are invited to submit applications. SBIR human genome topics concentrate on innovative and experimental approaches for carrying out the goals of the Human Genome Project (see SBIR, p. 63, in Part 2 of this report). The Small Business Technology Transfer (STTR) Program fosters transfers between research institutions and small businesses. [DOE SBIR and STTR contact: Kay Etzler (301/903-5867, Fax: -5488, Kay.Etzler@oer.doe.gov), <http://sbir.er.doe.gov/sbir>, <http://sttr.er.doe.gov/sttr>]



Capillary Array Electrophoresis (CAE). CAE systems promise dramatically faster and higher-resolution fragment separation for DNA sequencing. A multiplexed CAE system designed by Edward Yeung (Iowa State University) has been developed for commercial production by Premier American Technologies Corporation (PATCO). In the PATCO ES9600 model, DNA samples are introduced into the 96-capillary array; as the separated fragments pass through the capillaries, they are irradiated all at once with laser light. Fluorescence is measured by a charged coupled device that acts as a simultaneous multichannel detector. (Inset circle at upper left: Closeup view of individual capillary lanes with separated samples.) Because every fragment length exists in the sample, bases are identified in order according to the time required for them to reach the laser-detector region.
[Source: Thomas Kane, PATCO]