At RTI International, our engineers help clients achieve their goals through the identification, development, application, and transfer of leading-edge technologies. Our expertise spans the energy, health, environment, electronics, and advanced materials markets. We have proven capabilities to successfully execute early- and late-stage R&D programs, and to lead programs from initial R&D to prototyping to commercialization.
R&D efforts at RTI are driven by multifunctional teams, drawing on the diverse backgrounds of our staff of experienced professionals, as well as our close working relationships with federal, industrial, and academic laboratories.

**Energy and Process Engineering**

Our scientists and engineers conduct applied R&D to solve energy-related problems faced by the power, chemical, and petroleum refining industries, as well as the transportation sector. We work with process licensors, gas processing companies, oil refiners, chemical manufacturers, clean fuels developers, catalyst manufacturers, and other commercial clients, as well as the U.S. Department of Energy and other government agencies.

**Advanced Materials**

RTI conducts basic and applied research in materials science, offering expertise in synthesis, characterization, and modeling to design new materials or improve the performance of existing materials.

For example, we have developed in-house capabilities in colloidal and aerosol science to synthesize, modify, and integrate customized nanoparticles and quantum dots using state-of-the-art techniques. We are using quantum dots (image above) to increase the efficiency of solar cells, and we are developing large-area arrays of infrared photodetectors fabricated by inkjet printing. We are also combining quantum dots and nanofibers to create photoluminescent nanofibers that can be tailored for specific end-use applications such as solid-state lighting.

**Application Areas**

- Clean coal and fuels
- Solar derived fuels
- Oil/gas drilling
- Hydrogen production/purification

RTI is a founding member of the Research Triangle Energy Consortium (RTEC), an energy-sector alliance with Duke University, North Carolina State University, and the University of North Carolina. Under the leadership of Dr. Vikram Rao, RTEC works to solve high-impact energy problems by combining science, technology development, environmental sciences, and policy.

**Materials Science Capabilities**

- Materials characterization
- Nanotechnology
- Polymer processing
- Aerosol physics
- Cement and concrete technology

**Application Areas**

- Nano-enabled materials
- Energy-efficient lighting
- Metamaterials
- Solid-state nucleons
- Infrastructure and construction

**Health and the Environment**

Our scientists and engineers routinely bring their expertise to bear on a host of technical challenges that directly affect health and the environment—from exposure monitoring to innovative new medical devices.

For example, RTI is home to internationally recognized experts in aerosol science who study environmental implications of aerosols. Our extensive test facilities include wind tunnels, test
ducts, and cleanrooms, and our suite of aerosol measurement and generation enable us to synthesize and characterize broad aerosol chemistries and determine their effects on human health.

**Health and Environmental Capabilities**
- Environmental modeling
- Exposure analysis and monitoring devices
- Biomedical engineering

RTI conducts research on behalf of the U.S. Environmental Protection Agency, National Institutes of Health, National Institute of Environmental Health Sciences, and other agencies.

**Application Areas**
- Life sciences and diagnostics
- Medical technologies and devices
- Air filtration
- Water purification
- Personal exposure monitoring devices
- First responder monitoring devices
- Development and testing of protective clothing
- Biomaterials
- Biomedical devices

**Electronics**
RTI is a leader in the research, development, and prototyping of innovative materials, microstructures, and devices. We specialize in solving difficult technical problems and partnering with clients to further develop their technologies. Our cleanrooms and laboratories are professionally staffed with experienced chemists, metallurgists, material scientists, physicists, and biophysicists. Our work supports the U.S. Department of Defense, National Institutes of Health, and other agencies.

**Microfabrication Capabilities**
- Photolithography
- Wet and dry etching
- Thermal processing
- Ultra-fine-pitch flip-chip bumping
- Fine-pitch flip-chip assembly
- Fluxless soldering and assembly using plasma-assisted dry soldering
- Packaging and assembly
- Electrical and optical testing
- Reliability testing
- Materials characterization through surface and bulk-film analysis

**Application Areas**
- Thermoelectric devices
- Sensors and actuators
- 3-D interconnect technologies
- MEMS devices
- Flexible displays and electronics
- Advanced electronic packaging solutions
- RF sensors
- Digital signal processing
- Power and thermal management
- Ultra-low power devices
- Thin film devices

**Technology Applications and Commercialization**
By combining technical and business expertise, proven processes, and unparalleled resources, we help clients commercialize technologies through a comprehensive suite of services. Clients include a diverse set of private-sector companies, NASA, the National Institute of Standards and Technology, and other agencies, as well as universities.
We also help communities in the U.S. and other countries transform their economies by designing, implementing, and evaluating policies and practices to encourage economic development, workforce development, and entrepreneurship.
Commercialization Capabilities
- Open innovation—innovation management, market intelligence, landscape analysis, technology scouting, and partnership development
- Innovation-led economic development—strategic planning and policy development, industry and market assessments, and program evaluation and benchmarking
- Technology commercialization support—opportunity assessment, licensing support, and strategic advising

Application Areas
- Advanced materials
- Aerospace
- Chemistry
- Communication
- Energy and power
- Environmental sciences
- Image and signal processing
- Life sciences
- Manufacturing processes
- Mechanical systems
- Medical devices
- Microelectronics
- Optics and optical systems
- Sensors and instrumentation
- Transportation
- Policy

Every day, our scientists and technicians conduct leading-edge research in emerging markets and technologies. Our history includes several successful commercial ventures with roots in funded research programs, including
- Spin-offs—Ziptronix, Nextreme Thermal Solutions, and siXis, Inc.
- Technology licensing—We are working with Eastman Chemical Company to develop and commercialize a jointly developed synthetic gas (syngas) clean-up technology. We have combined the intellectual property resulting from the collaboration and are offering the technology package for further scale-up and commercialization.

RTI has a pipeline of new technologies and actively seeks to partner with industry to develop these technologies into valuable assets.

More Information
Debbie Retzlaff
Engineering and Technology Unit
919.541.6072
dar@rti.org
RTI International
PO Box 12194, 3040 Cornwallis Road
Research Triangle Park, NC 27709-2194 USA