

RAJENDRA K SHAH (RAJ)



5809 Dapple Trace, Indianapolis, IN 46228
raj.shah5809@gmail.com

(317) 698-7354

EXPERT INNOVATOR: Energy-efficient home comfort solutions

Areas of Expertise

- Deep domain knowledge in residential Heating, Ventilating and Air Conditioning (HVAC) systems
- Technology integration, control algorithms, modeling and simulation, data analytics
- Strategic, customer-focused solutions driving sustained competitive advantage and growth
- Cross-functional leadership delivering successful product launches
- Extensive technical expertise related to patents

Innovations

- [50 patents granted](#), 9 pending, primarily related to residential HVAC systems
- Features benefiting homeowners and service technicians: *energy savings, superior comfort, intuitive user interfaces, simplified installation, diagnostics*

PROFESSIONAL EXPERIENCE

AnalyzRS LLC, Principal

2016 -

Consulting, contract and advisory roles in HVAC systems, Internet of Things, data analytics, cloud applications, patent analysis, expert support for patent litigation.

- Expert witness: Honeywell vs Research Products patent litigation case related to HVAC zoned systems (2018-19)

UNITED TECHNOLOGIES CARRIER CORPORATION, INDIANAPOLIS, INDIANA

1991 - 2016

- **Highlight:** As “Mr. Infinity”, I created vision, strategy and innovations for Carrier’s Infinity® home HVAC system. Launched in 2004, ground-breaking system quickly blew past sales expectations. Fifteen years and multiple upgrades later it continues as Carrier’s highly profitable top-of-the-line residential system.
- Inventor witness: Carrier vs Goodman patent case, including successful jury trial, for enforcement of one of my Infinity® patents.

Engineering Fellow, Systems and Controls (2008 – 2016)

One of first eight Fellows selected to Carrier’s top engineering position from thousands of engineers worldwide.

Product advances

- [Infinity® Touch Control](#) with internet connectivity launched in 2012. Received Dealer Design Gold award from industry magazine ACHR News in 2013. I was interviewed for July 2013 ACHR News article.
- Led advanced team to develop data-driven home energy models to provide homeowners with simulated predictive estimates of the energy impact of various comfort settings – for Infinity® and thermostats.

Leadership, strategy, methodology

- Provided leadership, domain knowledge guidance, architectural inputs and algorithm logic to system and software engineers for Infinity®, thermostats and HVAC equipment. “Go-to expert” for field issue resolution.
- Accelerated development and increased software robustness utilizing simulation model-based Graphical User Interface and control algorithm design as well as field data acquisition and analysis techniques.
- Worked with legal team for patent landscape assessments and patent analysis.

Government agency interaction

- Participated in series of Environmental Protection Agency workshops to develop methods to qualify internet connected thermostats for Energy Star rating.

UNITED TECHNOLOGIES CARRIER CORPORATION (continued)**Engineering Manager, Systems Development (2000 – 2008)**

- Managed 10 development engineers. Designed premium air conditioners, heat pumps, indoor fan coils, advanced thermostats, multi-zone controls and indoor air quality products. Multiple product launches resulted in sustained growth in unit sales and profits.
- New technologies incorporated included inverter driven compressors, advanced brushless DC variable speed fan motors, germicidal air purifier and many new control algorithms. A number of patents were granted for these improvements.
- Infinity® system, highlighted above, was developed by my team and launched in 2004 with great market success. Completely new system architecture, communicating and self-configuring controls and excellent functional integration among installed equipment enabled a set of sophisticated features (many patented) that were nevertheless easy to use, install, set up and service.

Senior Program Manager, Advanced Systems (1991 – 2000)

- Pioneered the launch of new product categories for Carrier, including two stage air conditioners & heat pumps, variable speed fan coils, digital thermostats, multi zone controls, expandable filters and fresh air ventilators. Led a group of eight engineers. New product lines achieved enthusiastic market acceptance, drove sales growth and set the stage for future breakthroughs.

ADDITIONAL RELATED EXPERIENCE**GENERAL ELECTRIC GE MOTORS (now REGAL)****Project Manager, Electronically Commutated (Brushless DC) Motors**

Introduced GE's new line of brushless DC variable speed motors targeted at residential heating and air conditioning applications. One highlight was motor's built-in capability to control air flow delivered through home duct system independent of variations in duct restriction. My patent for this feature was part of enforcement litigation and, as the inventor, I was extensively deposed.

UNITED TECHNOLOGIES ELECTRONIC CONTROLS**Project Engineer, Control Design**

Designed high volume electronic controls, including electronic circuit design and microprocessor software, for appliances and heating and air conditioning systems.

EDUCATION

BS Electrical Engineering, Indian Institute of Technology, Bombay, India

MS Electrical Engineering, Ohio State University, Columbus, Ohio

MS Business Administration, University of St Francis, Fort Wayne, Indiana

PERSONAL

US citizen, married