Bio:

Dr. Umesh Patil, R&D Manager, Air Products Technology Center

Umesh has been the Air Products Technology Centres' R&D manager since 2018. He oversees Air Products' research collaboration activities in the Middle East, collaborating closely with major customers and universities. His technology team supports Air Products' business, operations, and joint ventures in Grey, Blue, Green hydrogen and Residue Gasification. Umesh holds both an M.S. and a Ph.D. in Materials Chemistry. He has spent the last ten years in Saudi Arabia working on technologies ranging from molecules to megawatts scale in the energy, petrochemical, and oil and gas sectors, with increasing responsibilities throughout his career.

Dr. Umesh Patil

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Professional Summary

I have a wide spectrum of technical, engineering and project management experiences. I have worked on projects with customers in clean energy, hydrogen, helium, ammonia, rare gases, gasification, oil and gas, power, aluminum, glass, cement industries.

Some of my main roles in the past include R&D manager, engineering manager, technology manager, product development, offering development, technology evaluation, process optimization, and plant engineering. I have worked with customers around the Middle East region and have experience establishing research centers, building teams, capital expenditure planning, and building bridges between commercial, technology, engineering, and plant operations to accelerate product development and offerings.

Work History

Technology Manager for Blue Hydrogen-CCUS and Green Hydrogen

Air Products Technology Center - Dhahran Techno Valley, Saudi Arabia — Aug 2017 - Present

Founding member of the Air Product Technology Center in Saudi Arabia, lead 11 researchers and a business development taskforce supporting major Grey, Blue, and Green H_2 businesses and operations.

Key Responsibilities & Accomplishments as Technology Lead for Blue Hydrogen Taskforce:

- Lead project execution for Saudi Arabia's first even Hydrogen Refueling Station (HRS) in collaboration with Saudi Aramco
- Leading techno-commercial proposals efforts for major oil companies in KSA, Bahrain, and UAE with a strategy focused on retrofitting their existing grey hydrogen plants to blue hydrogen by offering CO_2 capture solution that fits customers price expectations and carbon intensity target.
- Supporting the work of government relations, communications and business areas ensuring the voice of Air Products is heard.
- Ensuring all the proposed CCUS technology adheres to Process Safety policies, standards, and requirements.
- Developing knowledge of leading academic (KAUST, KFUPM) and industrial research initiatives into Hydrogen & CCUS technologies, building, and maintaining links with global experts in academia and industry.
- Leading the development of demonstration-scale Blue H_2 Innovation Center at DTVC in collaboration with Saudi Aramco.
- Understanding the impact of government policy in ME regions for CCUS. Working with external consulting firms like BCG on evaluating how that will impact Air Products CCUS strategy with commitment to find a home for 0.7 MTPA CO_2
- Ensuring the dissemination of CCUS knowledge and expertise across the global organization, ensuring all teams are up to date
- Managing the H_2 and CO_2 related Stage-Gate® process for their activities, preparing documentation, completing commercial evaluations.
- Training and development of other engineers, scientists, university researchers & fresh technical sales personal.
- Providing high-level insight into the Air Products patent portfolio and that of our competitors.

Leading following Green H_2 - Value Chain workstreams in support of NEOM HELIOS GREEN H_2 PROJECT

NEOM HEIOS will be the world's first project to produce Green Ammonia at a commercial scale (3500 TPD nominal capacity)

- Investigating and shortlist all green hydrogen generation options
- Investigating and shortlist all H_2 carrier media option (TRL-4 and above)
- Investigate all H_2 dissociation options from the various carriers. NH_3 crackers: 10 to 1000 TPD capacity
- Investigate all H_2 distribution options: Onsite ammonia cracker development
- Techno-commercial evaluation and validation of all options and their combination under consideration of:
    - Local legislations
    - Codes and standards
    - Maturity grade of commercialization

As an industrial SME for H_2, invitation to contribute a chapter to the book "**Saudi Arabia and the Hydrogen Economy: Domestic Developments and International Opportunities**," jointly edited by KAUST and KAPSARC. Expected publication date: Nov 2021

Technology Lead – GE Global Research, ME

General Electric -Global Research Center - Dhahran Techno Valley, Saudi Arabia Jul 2015 – Dec 2016

Appointed based on a track record of team startup and effective client relationship management at Baker Hughes. Priority was restoring the confidence of a key client by improving the new Center's performance. Focus was on working with national ecosystem to co-innovate customer solutions for the technical challenges in Saudi & Kuwait related to power generation and Oil & Gas.

Key Achievements:

- Led development of robust center technology & innovation strategy in collaboration with diverse global/regional multi-business GE teams & key external stakeholders
- Generated and maintained short/medium/long term collaborative tech project pipeline, generating tens of millions of dollars.
- Established credible, long-lasting customer relationships at all levels forming profitable and sustainable partnerships
- Transformed center performance taking it from being one of the lowest rated performers in the science park to becoming the benchmark for high performance

R&D Manager: Enterprise Research

Baker Hughes - A GE Company, Dhahran Global Technology Center, Saudi Arabia Feb 2013 – Jun 2015

Established Dhahran Global Research Center for Baker Hughes that provide a strong technical support to operations and major customers across the ME region for a complete geochemical analysis generating a revenue of ≈ $3.5 M every year.

- Provided technical leadership on R&D projects leading a multi-disciplinary group of 5 scientists and 3 lab technicians
- Coached the team through the development of a portable Lab on Wheels for real-time wellsite analyses during drilling operations (TRL-9) – Revenue generated in 2014-2015: $2.8 M
- Recruited/trained a team of high-potential engineers and integrated them with a globally distributed O&G team
- Championed and successfully executed a plan to grow/align team skills/resources with global/local business needs

SABIC Post-Doctoral Fellow

King Abdullah University of Science & Technology (KAUST), Saudi Arabia Mar 2011 – Jan 2013

- Setup a $1.5M worth state of the art Catalysis lab at KAUST
- Developed a novel inorganic adsorbent with a very high CO_2 capture capacity and excellent thermal stability
- Developed a catalyst that could convert methane to acetic acid in a single step reaction.

NASA and NSF sponsored Post-Doctoral Fellow

University of Puerto Rico, Mayaguez, USA Oct 2010 – Mar 2011

Project: Breathing easy on the space station. Removing CO_2 from space craft using novel adsorbent

Education

Doctor of Philosophy (Ph.D.), Materials Chemistry
University Department of Chemical Technology (UDCT), University of Mumbai, INDIA Sept 2010

Master of Science (MSc), Analytical Chemistry
University of Mumbai, INDIA April 2006

Publications

8 peer-reviewed research publications in international journals of repute. 4 filed and 1 granted US patents – Details available on request