MADHUR BHAIYA

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Education

- **University of Alberta** Edmonton, CANADA
  ***M. Sc.**; Mechanical Engineering* *January, 2012 - December, 2013*
  - *Dissertation*: **An open-source two-phase non-isothermal mathematical model of a polymer electrolyte membrane fuel cell.**
  - *Awards*: Mary Louise Imrie Graduate Student Award
  - *GPA*: **3.9/4**
- **Indian Institute of Technology Delhi** Delhi, INDIA
  ***B. Tech.**; Mechanical Engineering* *August, 2005 - May, 2009*
  - *Awards*: Institute Merit-cum-Means Scholarship (for 3 years)
  - *GPA*: **7.2/10**
- **Senior Secondary (12^{th})** *CBSE, 2005* **84 %**
- **Secondary (10^{th})** *CBSE, 2003* **92 %**

Work/Research Experience

- **KDK Softwares** Jaipur, INDIA
  Chief Technology Officer *September 2020 - Present*
  - Started the cloud based SaaS product development in the organization (previously, only desktop products offered by the organization). Cloud product offerings have now scaled to 10,000+ paid customers all over India.
  - Built 3 large scale tax compliance products from ground up, *viz.*, expressgst.com, expresstds.com, expressitr.com, and, couple of internal applicatons for license management, CRM, etc.
  - Built a cloud development team of 25+ developers from scratch. Started with PHP (Laravel / Lumen) backend tech stack and now evolving to Golang tech stack, using the same team.
  - Technologies: Golang, PHP, MySQL, Postgres, ReactJS, Python, Nginx, Apache2, Git etc.
- **Wholesalebox.in** Jaipur, INDIA
  Co-Founder — Director *April 2015 - September 2020*
  - Built the complete technology stack of wholesalebox.in, a B2B ecommerce startup (received pre-Series A investment).
  - Product suite includes customer facing ecommerce desktop and mobile (separate codebase) website, Android, iOS applications, internal applications such as CRM, Admin panel for order, product, customer, seller management from backend, seller facing application for order and product management, B2C websites for retailers (customers), etc.
  - Experience of building a business from ground, and scaling it to a 200+ employee team (40+ development team), with thousands of active customers (retailers) all over India.
  - Technologies: PHP, MySQL, Postgres, ReactJS, Apache SOLR, Elastic Search, RabbitMQ, React Native, Android, Scala, Python, Nginx, Apache2, Git etc.
- **Emerson (formerly, Energy Solutions International Inc.)** Calgary, CANADA
  ***Application Specialist**, Remote Automation Solutions* *April 2014 - July 2015*
  - **Executed** real-time transient hydraulic **simulation and analysis** of oil & gas pipelines and **augmented** the model by developing **better mathematical models** such as slack/multiphase analysis.
  - **Programmed** in a large-scale code using **Fortran** and **C++**, which incorporates **ObjectStore** as database management system and advanced object oriented concepts such as **MetaClasses**.

- **Actualized** GUI for hydraulic visualization, utilizing **Java Swing/AWT** classes.
- **Coded** in **Python** such as Network Socket Programming, File Management and wrapper programs, for instance, Fail-over management of a leak detection software.
- **Configured**, and **fine tuned** numerous pipelines using leak detection softwares such as LeakWarn Classic and PipeWorks. **Optimized** by reducing model error, hence reduced false alarming rates.
- **Promoted Excel Macro coding** for automated post processing of monthly results, thereby **optimizing** time usage; **interfaced NIST Refprop** package to Excel spreadsheet for generating product definition files for leak detection software.
- Experience of various **make systems**, in-house problem reporting and ticketing system code, and **repository management** using **CVS**.

- **University of Alberta** Edmonton, CANADA
  ***Research Assistant**, Energy Systems Design Laboratory* *January 2012 - March 2014*
  - **Crafted** a comprehensive **mechanistic mathematical model** for **heat transfer** and **liquid water transport** (**thermal, multiphase** effects) inside a **PEM fuel cell**.
  - Utilized **non-linear continuous Galerkin FEM**, **adaptive meshing**; **programmed** the model in C++ (30,000+ code lines), and **integrated** into an open-source fuel cell simulation software. **(www.openfcst.org)**
  - Experience of linux based **software development and management**; **SVN**; **GIT**; **Test driven development** (Unit Testing); **Build Factory**; **Generic programming** (templates); **CMake**; Parallel processing using **MPI**.
  - **Published** 1 International Journal paper and 3 International Conference papers.
  - **Teaching Assistant**: Thermo-Fluids Systems Design, Energy Conversion

- **Hindustan Aeronautics Limited** Bangalore, INDIA
  ***Design Engineer**, Aircraft Research & Design Centre* *June 2009 - December 2011*
  - DeNovo **design** and **simulation** of aircraft fuel system; complex **pipe network design** and **hydraulic analysis and simulation**; flow valves, pumps and LRU **design** and selection.
  - Extensive experience of **CAD modelling** and using **drawing revision control** software such as **Unigraphics** and **Teamcenter**, in a large-scale **development project** of a turbo trainer aircraft.
  - **Initiated innovative approaches** such as **CFD** studies of an aircraft fuel tank for sloshing issues and gauging table determinations.
  - **Designed, modeled and analyzed** engine mounting structure using **FEA** software.
  - **Involved** in the rigorous ground and flight **testing** exercise of the fuel system components.
  - **Gold medal winner** in AFTC training module conducted by Indian Air Force, and was chosen to **lecture** a series on **Current aircraft fuel system design practices & innovative approaches** to senior executives.

- **Whirlpool of India Pvt Ltd** Pune, INDIA
  ***Intern**, Product Development Centre* *May 2008 - July 2008*
  - **Refined** a skin condenser based on **detailed thermal calculations** and **designed** a detailed CAD model using **Pro-E** software; **Improved** energy efficiency by 31%.
  - **Evolved** a non-linear **mathematical model** for skin condenser and non-adiabatic capillary tubes, and built a simulation tool using **MATLAB**.

Certifications

1. **PIPE - Pipeline Industry Proffessional Education**, November 13, 2014.
2. AFTC (Air Force Technical College), Jalahalli Training Module, **Gold medallist**.

Other Research Experience

- **Undergraduate Research** Indian Institute of Technology Delhi
  Department of Mechanical Engineering *August 2008 - May 2009*
  - **Simulated coupled CFD & FEM**, utilizing **ANSYS**, on a diffusion-bonded heat exchanger.

- **Evaluated** deformed conditions, causing flow pattern variations and performance reduction.

- **Undergraduate Research** — Indian Institute of Technology Delhi
  Department of Mechanical Engineering — *January 2008 - May 2008*
  - **Developed** component and system level **mathematical models** of a cascade refrigeration system.
  - **Developed** and **programmed** an iterative algorithm to **simulate the system behaviour** with minimum number of input assumptions.
  - Published two conference papers (1 International and 1 National).

- **Undergraduate Research** — FMD Auto, FH Dusseldorf, Germany
  Department of Mechanical Engineering — *May 2007 - July 2007*
  - **Analyzed** a combine harvester with stripper header technology using **CFD** tools, for **improvement** in **power consumption** and **quality** of cut straw particles.

Publications

1. **Madhur Bhaiya**, Andreas Putz, Marc Secanell, "Analysis of non-isothermal effects on polymer electrolyte fuel cell electrode assemblies", *Electrochimica Acta*, 167:160-171, 2014.
2. **Madhur Bhaiya**, Andreas Putz, Marc Secanell, "A comprehensive single-phase non-isothermal MEA model and analysis of non-isothermal effects", *ECS Transactions*, 64(3):567-579, 2014.
3. Marc Secanell, Andreas Putz, Phil Wardlaw, Valentin Zingan, **Madhur Bhaiya**, Michael Moore, Jie,Zhou, Chad Balen and Kailyn Domican, "OpenFCST: An open-source mathematical modelling software for polymer electrolyte fuel cells", *ECS Transactions*, 64(3):655-680, 2014.
4. **Madhur Bhaiya**, Michael Moore, Marc Secanell, "Development of a single-phase non-isothermal MEA model for multi-step Oxygen Reduction Reaction (ORR) kinetics", In *Hydrogen + Fuel Cells 2013*, June 16-19, 2013, Vancouver, CANADA.
5. Lalit M. Pant, Suraj Sharma, Sanjeev Jain, D.S.Samant, **Madhur Bhaiya** and R.S Aggarwal. "Low Temperature Refrigeration using Natural Refrigerants". In *ACRECONF*. February 20-21, 2009. New Delhi, INDIA.
6. Lalit M. Pant, **Madhur Bhaiya** and Sanjeev Jain. "Simulation of a Two Stage Cascade Refrigeration System using Natural Refrigerants". In *National Conference on Refrigeration and Air Conditioning (NCRAC)*. January 8-10, 2009. IIT Madras, Chennai, INDIA.
7. **Madhur Bhaiya**, Andreas Jahr and Holger Happel. "Harvesting-Combine-Flow Simulation Technique". *http://fhdd.opus.hbz-nrw.de/volltexte/2008/423*. 2007. FH Dusseldorf, GERMANY.

Leadership, Volunteering and Extra curricular

- **V.P. (Communications)**, Mechanical Engineering Graduate Student Association, University of Alberta.
- **Organizing committee member**, Literary Club, Hindustan Aeronautics Limited.
- **Teacher-cum-Volunteer**, National Service Scheme, IIT Delhi.
- Awarded **Best Fresher** of the House for Cultural Activities in 2005-06, IIT Delhi.
- **House Representative**, Literary & Dramatics Club, IIT Delhi.
- **Activity Head**, Sportech'08, IIT Delhi.

References available upon request.