# Summary

## Areas of Expertise

* Pipeline Hydraulics
* Blockage and Leak Detection
* Multiphase Flow Assurance
* Upstream and Midstream

## Technical Skills

* Synergy Pipeline Simulator (SPS), Pipeline Studio, and AFT Impulse.
* PIPESIM, OLGA, PIPEPHASE, PVTSim, Multiflash
* Python, Java, C++, VBA, Matlab
* Model Validation and Tuning
* Data Processing and Analytics
* Machine Learning

# Profile

A Professional Engineer with extensive experience in pipeline hydraulics and network optimization for capital projects and operational support. As a subject matter expert, provides system configuration, technical and simulation support for production, and pipeline operations. Proven track record of new technology development and deployment. Strong teamwork and communication skills. Has published and presented 10+ peer-reviewed papers.

# Professional Experience

## Senior Lead Engineer, Hydraulics and Process

## Wood Group Plc, 2011 – Present

Lead pipeline hydraulic analysis and design. Interface with facilities engineers to optimize network performance for the whole life cycle. Develop and implement workflows, practices, and procedures. Mentor junior engineers. Facilitate design review and HAZOP. Estimate man-hours and prepare bid proposals. Deliver great presentations to management, clients, and peers.

#### Selected Projects:

#### ExxonMobil, Baton Rouge Pipeline Improvements, Louisiana, USA

Conducted steady state and surge analysis in SPS for Propane and Butane systems. Developed a Viewport interface for system controls. Calculated maximum pressures and unbalanced forces of the systems for various upset scenarios. Checked the adequacy of pumps.

#### Phillips 66, Gray Oak Pipeline Project, Texas, USA

Conducted steady state and surge analysis in SPS for third-party pipelines. Identified relief valve requirements and sizing relief valves. Estimate unbalanced force load using self-developed code in SPS.

#### Chevron, Bay Area Pipeline Surge Analysis, California, USA

Conducted steady state and surge analysis in SPS. Validated and tuned the models using field data. Calculated maximum capacities with DRA injections. Checked the safety relief device adequacy.

#### Suncor, Syncrude Interconnection Pipeline, Canada

Performed bitumen pipe pre-heating analysis using HYSYS Dynamics. Conducted hot bitumen cooldown, re-start analyses using SPS. Calculated unbalance forces during upset scenarios. Tuned fluid viscosity and density to match measurement data.

#### Saudi Aramco, Jafurah Unconventional Development Projects, Saudi Arabia

Headed a thermo-hydraulic analysis for shale development. Built a PID control system to simulate well dynamic startup scenarios. Developed an OLGA solution to model solar radiation impact on above-ground pipelines. Optimized field layout using GIS-based pipeline models. Upgraded batch simulation by developing a Python tool. Calculated MeOH injection amount and wax appearance temperature. Determined surface pressure for maximizing production during depletion.

#### Shell/Williams, Appomattox/Norphlet Gas Gathering Junction Facility Development, Gulf of Mexico

Led a startup and N2 removal analysis for a Norphlet deepwater export line. Performed a thermo-hydraulic analysis for an Appomattox deepwater tie-back pipeline. Established hydrate, flare, and liquid management philosophies.

#### ConocoPhillips, Montney Pipeline Project, Canada

Re-created well fluid from lab test data in Multiflash. Performed sizing and pigging simulations for various GORs in OLGA. Checked hydrate risk, and the adequacy of slugcatchers. Tuned wet crude viscosity against experimental data.

#### ConocoPhillips, Delaware Off-Take Study, Permian Basin

Directed manhour estimates. Developed flow assurance design basis. Supervised transmission line size optimization in PIPESIM. Performed OLGA transient analysis to determine surge volume.

#### ConocoPhillips, Delaware Infield Gathering FEL-1 Study, Permian Basin

Led thermo-hydraulic analysis in PIPESIM from wellpads to the sale points. Optimized pressures, compression, and numbers of central facilities. Recommended gas lift compression location. Performed OLGA analysis for hydrate risk assessment and slugcatcher sizing.

#### ConocoPhillips, Eagle Ford Shale Multiphase Flowline Analysis, Texas

Oversaw thermos-hydraulic analysis in PIPESIM for HP, LP, and gas lift pipelines for COP Eagle Ford shale gas gathering systems. Built GIS-based PIPESIM models, and validated the models against field data.

#### Woodside, Pluto LNG EPC Project, offshore Western Australia

Performed HYSYS and PIPESIM simulations. Conducted pipeline cooling down and insulation simulations in OLGA. Calculated relief valve size. Developed solutions for sulfur deposition problems.

#### Zakum Development Company (ZADCO), Zirku Flare Study, UAE

Carried out blowdown simulations in HYSYS and established relief loads. Conducted flare network simulations and radiation calculations. Played a key role in system layout optimization.

#### Saudi Aramco, Khurais Increment Project, Saudi Arabia

Conducted thermo-hydraulic analysis for satellite GOSP pipeline systems. Optimized loop line length and recommended the best solution. Developed a Python subroutine in SPS to simulate an energy recovery system. Performed surge analysis and checked the adequacy of the existing SRV systems. Tuned OLGA viscosity model and investigated into the impact of emulsion viscosity on wet crude pipeline hydraulics.

#### Centrica, Block 22 Floating LNG Conceptual Study, Trinidad and Tobago

Responsible for subsea pipeline network OLGA simulation for different operation scenarios. Performed hydrate simulation to assess the hydrate plugs and the required inhibitors to mitigate the hydrate risk. Investigated the effect of gas/condensate flow regime on the corrosion inhibitors efficiency.

#### MEDCO International Ventures Limited, Libya Area 47 Development Project, Libya

Performed upstream oil and gas separation HYSYS process simulations. Oversaw and mentored young engineers to do steady state pipeline simulations, three-phase separator, scrubber, pump and compressor sizing. Prepared process documents including the basis of design, simulation report, etc.

#### Saudi Aramco, Interface Management and Minimization Study, Saudi Arabia

Developed a batch interface model based on the Austin Palfrey method. Calculated batch interface volumes, and validated the calculations against actual data.

#### ExxonMobil Iraq, Export Oil Pipeline Study, Iraq

Conducted oil export pipeline flow assurance simulations in PIPESIM. Analyzed the adequacy of existing facilities. Authored technical reports.

#### World Bank Group, Carbon Capture and Storage (CCS) CO2 Transportation Study, China

Investigated into different equations of state used for CO2 transportation simulation. Conducted CO2 pipeline thermos-hydraulic simulations in PIPESIM, and mentored junior engineers on pump sizing. Assessed different options and recommended the best option for CO2 transportation.

# Previous Experience

## Development Engineer, Circor Energy, 2008-2011

Responsible for the provision of hydraulics knowledge to managers, project personnel, clients and third parties. Produced reports, detailed plans, and procedures. Developed and commercialized a pipeline on-line monitoring system which enables detection of blockages and leakages in live subsea pipelines. Conducted JIP projects with universities and industrial clients, and mentored young engineers working towards professional status.

*Selected projects*:

*BP, Bruce Subsea Pipeline Project, North Sea*

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*PETRONAS, Subsea Pigging CFD Study, Malaysia*

*Regency Gas (USA), Gas Pipeline CFD Study, Texas*

*Duke Energy (USA), Cooling Water Pipeline Hydraulic Study, South Carolina*

*Harvest Pipeline (USA), Onshore Pipeline Project, Texas*

## Earlier experience, 1999 to 2008

The University of Manchester, 2006 to 2008 –R&D Engineer

The University of Nottingham, 2002 to 2006 – Research Assistant

Beijing Oriental Jicheng Company, Ltd., 1999 to 2002 – Process Engineer

# Qualifications

## Education

Doctor of Philosophy (Ph.D.), Chemical and Environmental Engineering, University of Nottingham, UK

Bachelor of Engineering, Processing Engineering, University of Science and Technology, Beijing

## Certifications / Licenses

Licensed Professional Engineer, Texas (#118804)

Chartered Engineer, Engineering Council, UK