

Company/lab name: Shell Brazil Ltda

Company/lab website:

<https://www.shell.com/energy-and-innovation.html>

<http://www.ctc.puc-rio.br/english/>

Name of the Project:

Wellbore Strain Sensors (In-Well Sensing)

Duration / City in Brazil: 10 weeks / Rio de Janeiro

Area: PTI R&D

Company/Lab Description:

Shell PTI R&D Brazil is a multidisciplinary team responsible for developing Research, Development and Innovation (R,D&I) projects to add value across Shell's Global E&P activities with particular focus for deployment in Brazilian Pre-salt Deepwater environment. A strong part of the Brazilian R&D business is to work on partnership with academic institutions and innovative companies around the world and generate technology that offer the greatest potential value to our business, industry and supply chain. In this context, Shell is working with PUC-Rio University (Laboratory of Fiber Optic Sensors – LSFO) for a project aiming for integrated reservoir management & monitoring techniques with efforts to involve the development of fiber optic and Micro-Electrical-Mechanical (MEMS) based sensors.

Project Description and Goals:

The aim of the Wellbore Monitoring System – MEMS project is to develop a solution based on passive MEMS sensors to perform behind-casing measurements for continuous real time well integrity, monitoring strains in the casing string produced by the surrounding rock formation for the Oil & Gas industry. The research addresses downhole reliability, packing, power generation and telemetry challenges associated to the deployment of downhole reservoir surveillance in the oilfield. Results may be applied to calibrate geomechanical models. The project is at a point to determine power transfer characteristics of an acoustic channel design. Power and data transmission through casing are accomplished via a novel downhole ultrasonic coupler. Expected results involve the provision of a prototype tested in laboratory conditions.

Intern Role Description:

As a member of the PUC project research team: investigate system efficiency of Power & Data transfer across the casing in the wellbore scenario at the Lab. Build knowledge on the Wellbore Monitoring System – MEMS project, understand its challenges and value to the Oil & Gas industry. Build an awareness of the Brazilian R&D project business delivery model. Contribute to critical Lab experiments related to the downhole ultrasonic coupler – specifically the acoustic channel characterization and performance (understand system efficiency, specimen preparation, setup experimental apparatus, conduct testing, analyze results, reporting). Connect to Shell Brazil multidisciplinary team (PTI R&D, Wells, Subsea) together with the project lead and participate on project progress meetings. Present internship results to Shell team. Proactively champion HSSE in projects and lead by example.

Profile of MIT student - Skills & Experience Pre-required (Portuguese proficiency?): Candidates majoring in physics, electronics, mechatronic/automation or mechanical engineering. Strong interpersonal, team working, and communication skills. Passion and ability for innovation and technical idea generation. Portuguese proficiency not mandatory, but is an advantage.

KEYWORDS: Wellbore technology, electronics, telemetry, geomechanics, business relevant R&D