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E A R T H ● E N E R G Y ● E N V I R O N M E N T

# Petroleum Engineering

Petroleum engineers have a wide range of career opportunities open to them, from drilling wells in the deepwater offshore of Brazil or in the Gulf of Mexico, to designing reservoir development plans in Malaysia. Petroleum engineers also are completing wells using horizontal drilling and multi-stage hydraulic fracturing in multiple shale basins in the United States.  After the sophomore year, a 2-week field session takes all the PE students to various oil and gas producing areas, from Alaska to the Permian Basin in Texas, for a hands-on introduction to the petroleum industry.  This allows the students to walk on a drilling rig or a LNG export facility, to learn what the industry is and its impact on the environment and the economy, and to develop friendships that will last a lifetime.  After the junior year, a second field session in Massadona, Colorado, exposes students to the geology that affects oil and gas production through a series of field exercises, followed by advanced studies of reservoir engineering based on the newfound understanding of "the rocks" during the senior year.  Many students will work as paid interns during the summers in industry, gathering valuable experience and exposure.  The standard degree for a practicing petroleum engineer is the BS degree, with nearly 100% placement at graduation.  Master and Doctoral degrees offered by CSM's Petroleum Engineering Department offer further opportunities and those graduate programs are highly competitive for admittance.

Petroleum Engineering uses the most advanced technologies available, necessary to drill wells in 10,000' of water, or with an extended reach of 30,000' laterally from the surface location.  These wells may cost $100,000,000 per well, necessitating the latest in computer hardware to handle the multi-million cell simulation models needed to project with acceptable accuracy the effect of those wells on development. Petroleum engineers must estimate and manage risk, including operational, and technical risks, or the uncertainty in future oil and gas prices.   The prospective employers may be large integrated, international companies, or smaller, nimbler independent oil and gas companies, with a more narrow focus.

After graduation, the petroleum engineer begins a path of lifelong learning, facilitated initially by membership as students in professional societies like the Society of Petroleum Engineers, the American Association of Drilling Engineers or the American Rock Mechanics Association, to keep abreast of the latest technologies. Petroleum engineers may specialize during their career in drilling, completions, reservoir or production engineering, or they may move from one area to another as the opportunities present themselves.  Petroleum engineers by nature are risk takers, and start up many companies at various stages of their career. Opportunities to travel to all the continents are available, and graduates may travel far from their home country during their career.

The industry outlook for petroleum engineers will continue to be strong, with some of the highest salaries of any professional.  The "shift change" is in progress, where engineers who graduated during the boom of the 70's and 80's are beginning to retire and must be replaced.  In addition, the recent shale developments, first in the United States and then across the world, will demand many petroleum engineers to successfully produce hydrocarbons in an economic and environmentally responsible manner.  The era of "easy oil" is over, and more engineers will be required with innovative ideas to produce the energy needed by the world's growing population, and manage energy price volatility.  These new engineers will work closely with other geoscientists in multi-disciplinary teams, and will need good communication skills to convey their ideas to various stakeholders, including their colleagues, investors and the public.