John Hannon

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Summary

Professional chemical engineer with expertise in technoeconomic analysis in renewable fuels and food products. Expert in heterotrophic and phototrophic algae production economics, cellulosic ethanol production, chemical and biological scale-ups, and catalytic technologies. Fifteen years' experience in technical due diligence for investment firms, start-up companies, and large companies as independent engineer investigating new technologies.

Education

Ph. D., Engineering Sciences, Dartmouth College (Hanover, NH), 2005-2008
M.S. Chemical Engineering, Northeastern University (Boston, MA), 2002-2003
B.S. Chemical Engineering, Northeastern University (Boston, MA), 1992-1997

Professional Experience

Registered Professional Chemical Engineer (P.E.), Massachusetts

2015 – Current: Chief Operating Officer, Vertimass LLC (Boston, MA)
Technology scale-up, licensing, business development, and intellectual property of novel ethanol to fuels and chemical catalytic conversion technologies. Recent Principal Investigator (PI) for $2.0 mil DOE award to scale-up laboratory technology to convert ethanol into renewable fuels and chemicals. Starting another new $1.4 mil DOE award as PI for ethanol to sustainable aviation fuels (SAFs) commercial demonstration scale-up.

2010 – Current: Consulting Engineer (Boston, MA)
Expertise in technical due diligence on various technologies for investment firms and independent assessments for placing valuations on new technologies and start-ups, focusing on renewable fuels and food products. Specializing in plant design, capital & operating costs, return on investment (ROI), IRR, Sensitivity analyses. Expertise in phototrophic algae systems to make oils and high value chemicals (Astaxanthin, DHA). Expertise in scale-up, Computational Fluid Dynamics (CFD), TechnoEconomic Analysis (TEA), Supercritical fluids (high pressure liquid carbon dioxide extractions, high temperature and pressure supercritical reactions). Assisting US Department of Energy (DOE) Project with start-up Vertimass LLC for scaling up conversion of ethanol to jet, diesel, gasoline fuels. Coordinate investor requirements, intellectual property, personnel, economic evaluations.

2008 – 2010: Senior Research Engineer, Mascoma Corp. (Boston, MA)
Project economics for biofuel production (Operating & Capital costs), Plant design & layout (PDF, P&ID, Mass & Energy Balances), Process optimization, Life Cycle Analysis, GHG reductions

2005-2008: Dartmouth College, PhD Research
Dissertation Hannon, John R. 2008. "Investigating the Scale-up of Anaerobic Soluble Sugar Fermentations for Large-scale Ethanol Production," PhD Thesis, Thayer School of Engineering, Dartmouth College, Hanover, New Hampshire, February.

2005-2012: CF-Technologies, High pressure Carbon Dioxide (CO_2) Extractions
Part-time work with high pressure CO_2 (and co-solvent) extractions for a number of projects including 1) hydrocarbon extraction with CO_2 from shale rock in collaboration with Schlumberger and Raytheon, 2) oil/lipid extraction from oleaginous yeast with high pressure CO_2, hexane, and dimethyl ether for renewable fuels in collaboration with TOTAL Energies, and 3) high value carotenoid and Omega-3 extractions from phototrophic algae in collaboration with several algae companies.

2002-2003: Northeastern University & CF Technologies (Boston & Hyde Park, MA)
MS Thesis: Design and construction of supercritical carbon dioxide (SCCO2) extraction system for removal of chemical warfare agent simulant Dimethyl methylphosphonate (DMMP). Complete high pressure liquid carbon dioxide extraction system to include GC analysis. Completed thesis nights while working TRI-MONT full-time day.

2001 – 2005: Chemical / Power Engineer, TRI-MONT Engineering (Boston, MA)
Design & planning of new cogeneration facilities, upgrading existing plants to meet new energy demands (new turbines/boilers/buildings/etc.). Preparing heat balances, P&IDs, PFDs, cycle and cost analysis for designing most effective plant layouts. Worked directly with clients for gas/oil turbine evaluation / testing. Analyze emissions from various gas/oil fired turbines, boilers, air permits. Clients included Chevron, Exxon, Sprague.

1997 – 2001: Petroleum Engineer, Schlumberger (Houston, TX & New Orleans LA)
Traveled nationally/internationally testing new, high-pressure gas & oil samples on exploratory gas/oil reservoirs for PVT analysis. Analyzed various oils with HPLC, GC and other chemical techniques. Worked independently as a company representative for 3 years. Clients included Shell, Exxon Mobil, Texaco, Chevron, Petrobras, BP
HAZMAT certified, Health & Safety Certifications

Military

1998-2006: Massachusetts National Guard (Quincy, MA)
Commander, Headquarters Btry, Mass. National Guard (3/04 – 9/06).
Executive Officer, C Btry, Mass. National Guard (8/00-3/04).
Fire Direction Officer, Mass. National Guard (1/98-08/00)

Selected Invited Talks

Hannon JR, *The Catalyst & Catalytic Upgrading Summit presented by the US Department of Energy Bioenergy Technologies Office,* Advanced Bioenergy Leadership Conference (ABLC), Washington, D.C. March 16-18, 2022.
Hannon JR "*Vertimass: Conversion of Biomass to Hydrocarbon Fuels and Chemicals*". Alternative Fuels & Chemicals Coalition (AFCC) Conference, Washington, D.C. November 15, 2021.
Hannon JR "*Vertimass: Conversion of Biomass to Hydrocarbon Fuels and Chemicals*". Renewable Fuels Association (RFA) Conference, Des Moines, Iowa. September 29, 2021.
Hannon JR "*Vertimass: Conversion of Biomass to Hydrocarbon Fuels and Chemicals*". Nuclear Biofuels Webinar. August 18, 2021.
Hannon JR "*Vertimass: Low Cost, Low Carbon Fuels Now*". Mick Law Energy Conference, May 17, 2021
Hannon JR, Wyman CE *"Novel Catalytic Conversion of Renewable Ethanol into Gasoline, Diesel and Jet fuel Blendstocks and Higher Value Chemicals (BTEX) to Partially Mitigate Climate Change"* MIT Energy Conference, Boston, MA May 23, 2019.
Mount Holyoke College, Holyoke, MA (Mar2016): "Lignocellulosic ethanol and Vertimass technology"
Univ. of New Hampshire, Durham, NH (Oct2010): *"Lignocellulosic Ethanol: Challenges and Opportunities"*
Biotechnology for Fuels and Chemicals, Nashville, TN (May 2006) *"Mixing and Scale-Up of Stirred Tank Reactors using Computational Fluid Dynamics"*
AIChE Annual Meeting, San Francisco, CA (Nov2006) *"Considering Advanced Biorefineries in Context"*

Selected Publications

Danielson N., McKay S., Bloom P., Dunn J., Jakel N., Bauer T., Hannon J., Jewett M.C., Shanks B. "Industrial Biotechnology—An Industry at an Inflection Point" *Industrial Biotechnology*, Vol. 16, No. 6, December 2020, DOI: 10.1089/ind.2020.29230.nda
Hannon JR, Lynd LR, Andrade O, Benavides PT, Beckham GT, Biddy MJ, Brown N, Chagas MF, Davison BH, Foust T, Junqueira TL, Laser MS, Li Z, Richard T, Tao L, Tuskan G, Wang M, Woods J, Wyman CE. 2019. "Technoeconomic and Life Cycle Analyses of Catalytically Converting Wet Ethanol into Fungible Fuel Blendstocks," *Proceedings of the National Academy of Science*, www.pnas.org/cgi/doi/10.1073/pnas.1821684116.

Lynd, L. R., M. Laser, J. McBride, K. Podkaminer, J. Hannon. Energy myth three – High land requirements and an unfavorable energy balance preclude biomass ethanol from playing a large role in providing energy services. Invited chapter in: B. Sovacool and M. Brown (eds.) Energy and American Society: Thirteen Myths, Springer, 2007.

Selected Patents

Wyman CE, Hannon JR. 2020. "Systems and Methods for Reducing Resource Consumption In Production Of Ethanol Fuel By Conversion To Hydrocarbon Fuels," US Patent 10,815,163 B2.
Wyman CE, Hannon JR. 2019. "Systems and Methods for Reducing Energy Consumption in Production of Ethanol Fuel by Conversion to Hydrocarbon Fuels," US Patent 10,315,965 B2.
Considine, B., J. Cogliandro, M. Cogliandro, J. Moses, J. Hannon, J. Markiewicz, "Apparatus for Extraction of Hydrocarbon Fuels or Contaminants using Electrical Energy and Critical Fluids," U.S. Patent # 8,096,349, 2012.
Considine, B., J. Cogliandro, M. Cogliandro, J. Moses, J. Hannon, J. Markiewicz, "Method of cleaning an industrial tank using electrical energy and critical fluid," U.S. Patent # 7,875,120, 2011.
Hannon, J.R., Wyman, C.E. "Systems and Methods for Improving Yields Of High Molecular Weight Hydrocarbons From Alcohols" U.S. Patent Application US 62/255502, 2015.
Hannon, J.R., Wyman, C.E. "Systems and Methods for Improved Hydrocarbon Fuel Yields" U.S. Patent Application US 62/315889, 2015.

Teaching (Adjunct Professor)

2007 – 2011: Quincy College (Quincy, MA)
Introduction to Chemistry & Lab, General Chemistry I, II
2012 – Present: North Essex Comm. College (Haverhill, MA)
Physics, Physical Science, Chemistry

Selected Awards

2019: Department of Energy Award: $1.434 million
2019: ChemCatBio Award, $700,000
2018: National Corn Growers Association Award: $25,000
2015: Department of Energy Award, $2.0 million
2007: Teaching Assistant Award (2): Dartmouth College

Other

Isothermal Turbo Compression (ITC), Appollo Wind Technologies (2010 – 2012)
Six Sigma Brown Belt (2006)
CO_2 Sequestration / Wind Energy Research, UMass Lowell (2003 – 2005)
Head Wrestling Coach, Hull High School, MA (2001 – 2003)