Daniel Klein-Marcuschamer

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Visa Status: US Permanent Resident / Green Card Holder

Work Experience

Lawrence Berkeley National Laboratory June 2009 - present

- Scientist and Director of Technoeconomic Analysis at the **Joint Bioenergy Institute** (previously Postdoctoral Fellow and Project Lead)
- Managing a team on process design and process economics of bioenergy technologies
- Identified various technological innovations with large impacts on biofuel economics (>$1/gallon)
- Leading and managing collaborations with government and industry, advising policymakers and commercial partners (GM, Boeing, Statoil, US Department of Energy, Senator Dianne Feinstein's Office)

University of Queensland, Australia Feb. 2011 – present

- Manager of Technoeconomic Analysis at the **Australian Institute for Bioengineering and Nanotechnology**
- Specializing in technoeconomic analysis of algae, oil seed, and fermentation technologies for jet fuel production
- Managing industry and government partnerships (GE, Virgin Blue, Boeing, Amyris Biotechnologies, IOR, Mackay Sugar Ltd., Queensland Government)

Greenlight Biosciences Inc. (Kodiak Venture Partners) July 2009 – present

- Consulting services and due diligence in metabolic and enzyme engineering, synthetic biology, process design, and economic analysis
- Participation in the Board of Directors through an Observer Agreement
- Using technoeconomic models to guide technology commercialization and attract ~$7 million investment from multinational pharmaceutical and chemical companies
- Actively contributing to intellectual property (see *Publications and patents* below)

Gehrson Lehrman Group July 2011 – present

- Member of the Energy and Industrials Council
- Technical consulting services to GLG clients

GIVE Eco Energy, Inc. Jan. 2010 – Nov. 2012

- Consultant and Chief Technology Officer
- Technology due diligence and strategy for bioenergy projects
- Co-developing and designing renewable electricity projects in Latin America and Europe

McKinsey & Co. March 2011 – August 2012

- Technical Expert: various instances; technology and business opportunities for lignocellulosic biorefineries

Tabletop Energy Feb. – Mar. 2012

- Consultant: due diligence, assessment of R&D opportunities, and investment viability

Gard Global Group Jan. – Feb. 2010

- Consultant and Technical Expert: carbon capture and sequestration through use of biosystems

C_3BioEnergy Sept. 2007 – July 2008

- The project aimed at becoming a start-up for the production of renewable propane and propylene
- Participated as an investigator and consultant under a grant awarded by the Deshpande Center for Technological Innovation (2007-08)

Education

Massachusetts Institute of Technology (Class of 2009) GPA 5.0 / 5.0

- Ph.D., Chemical Engineering
- Research focus: efficient production of biofuels and renewable-based chemicals
- Collaborations: Department of Energy, Verenium Corporation, Genomatica.

University of Texas at Austin (Class of 2005) *Summa Cum Laude* GPA 4.0 / 4.0

- Bachelor of Science, Chemical Engineering, Honors Program (subsystem: Biotechnology)

Teaching Experience

Guest Lecturer University of California, Berkeley Nov. 2009 – Aug. 2012

- Various lectures during this period in Biochemical Process Design, Energy from Biomass (Dept. of Chemical Engineering) and Cleantech-to-Market (Haas School of Business)

Guest Lecturer University of Queensland, Australia Apr. 2012, Apr. 2013

- Principles of Biological Engineering

Advisor and Lead Department of Chemical Engineering, UC Berkeley Summer 2010

- Advising Product Development Program (PDP) team on biofuel production processes

Advisor Haas School of Business, UC Berkeley Spring 2010

- Advising Cleantech-to-Market (C2M) team on analysis of biofuel enzyme technologies

Advisor Presidio School of Management Fall 2009

- Advising team on Project-oriented Learning (POL) Program titled: "Financial Model and Strategic Analysis of a Lignocellulosic Biorefinery"

Teaching Assistant MIT Sept. – Dec. 2007

- Subject: Chemical and Biological Engineering Laboratory

Tutor University of Texas Learning Center Sept. – Dec. 2002

- Subjects: Physics and Organic Chemistry.

Achievements and Awards

- JBEI Technical Contribution Award (August 2012, JBEI)
- Berkeley Lab Director's Award for Exceptional Achievement, Early Career Recipient (May 2012, LBNL)
- Permanent Resident Status awarded under a National Interest Waiver (Jan 2010)
- Outstanding Seminar Award (2008, MIT)
- CONACYT Fellowship (2007-08, MIT)
- Walsh Memorial Presidential Fellow (2005-06, MIT)
- Benjamin M Rosen Graduate Fellowship (2005, California Institute of Technology, Declined)
- Member of the Dean's Scholars Program (UT Austin)
- Celanese™ award for best research poster presentation (2003, UT Austin)
- TAMS Award, waiver scholarship for Mexican Students (2002, UT Austin)
- Member of the Mexican Team in the International Chemistry Olympiad (Bangkok, Thailand, July 1999)
- National Chemistry Olympiad: First Prize (Queretaro, Mexico, Apr. 1999)
- Metropolitan Chemistry Olympiad: First Prize (Mexico City, Mexico, Mar. 1999)

Leadership and Extracurricular

Contributor to the NRC Panel on Alternative Liquid Transportation Fuels May 2009

Organizer and panel co-lead MIT Energy Conference March 2009

- http://techtv.mit.edu/collections/mitenergyconference/videos/2142-2009-mit-energy-conference-advancing-bioenergy

Invited guest Reception for Jesus Reyes-Heroles, CEO of Pemex, Harvard Univeristy May 2, 2008

Organizer Visit of President Felipe Calderon Feb. 11, 2008

- Worked with students, Secret Service, and University representatives to organize a ceremony with the President and students in the Boston Area.

Several roles, including Vice-President Biodiesel@MIT Nov. 2006 – Jul. 2008

- Designing, planning, and working with the administration for installing a biodiesel processor on campus.
- Supervising undergraduate students in biodiesel-related research projects.
- The project was awarded a GE EcoImagination Challenge $25K grant on Spring 2007.

Officer SP Graduate Community, MIT June 2006 – June 2008

Officer Graduate Student Council for Chemical Engineering, MIT Academic year 2006-07

Prior Research Experience

Research Assistant	UT, Austin. Protein Engineering	Jan. 2003 – July 2005
Research Assistant	UNAM, Cellular Physiology and Genetic Engineering	Summer 2002
Research Assistant	UT Austin, Pharmacokinetics and Pharmaceutics	Jan. – Dec. 2001

Publications and patents

- **Klein-Marcuschamer D., *et al.*** (2013) Technoeconomic Analysis of Renewable Aviation Fuel from Algae, Pongamia seeds, and Sugarcane. *Biofuels, bioproducts, and biorefining.* doi: 10.1002/bbb.1404
- **Oleskowicz-Popiel P, *et al.*** (2012) Technoeconomic analysis of lignocellulosic ethanol production through ionic liquid pretreatment, acid hydrolysis, and sugar extraction. *Submitted*
- **Rosenboom JG, Klein-Marcuschamer D, and HW Blanch** (2012) Technoeconomic analysis of a lignocellulosic ethanol biorefinery with ozonolysis pretreatment. *Submitted*
- **Vickers CE, Klein-Marcuschamer D, and JO Krömer.** (2012) Examining the feasibility of bulk commodity production in *Escherichia coli. Biotechnology Letters*. 34 4: 585-596
- **Klein-Marcuschamer D., *et al.*** (2011) The challenge of enzyme costs in the production of lignocellulosic biofuels. *Biotechnology and Bioengineering.* Published online, DOI: 10.1002/bit.24370 **(Highlighted in *Biotechnolgoy and Bioengineering*)**
- **Oleskowicz-Popiel P, *et al.*** (2011) Co-production of ethanol, biogas, protein fodder and natural fertilizer in organic farming – Evaluation of a concept for a farm-scale biorefinery. *Bioresource Technol.* doi. 10.1016/j.biortech.2011.11.060
- **Klein-Marcuschamer D., *et al.*** (2011) Techno-economic analysis of a lignocellulosic ethanol biorefinery with ionic liquid pre-treatment. *Biofuels, bioproducts, and biorefining.* doi. 10.1002/bbb.303
- **Blanch HW, Simmons BA, and D Klein-Marcuschamer.** Biomass deconstruction to sugars. *Biotech J* 2011 doi. 10.1002/biot.201000180
- **Klein-Marcuschamer D, *et al.*** (2010) Technoeconomic analysis of biofuels: a wiki-based platform for lignocellulosic biorefineries. *Biomass and Bioenergy.* 34 (12): 1914-21. **(Highlighted in *Science*)**
- **Klein-Marcuschamer D and G Stephanopoulos** (2010) A method for designing and optimizing random strain improvement libraries. *Appl Environ Microbiol.* 76 (16): 5541-6
- **Klein-Marcuschamer D, *et al.* "**Biofuel System Economics." In Plant Biomass Conversion. Eds. Elizabeth Hood, Randall Powell, Peter Nelson. NY: John Wiley & Sons. *In press* (by invitation)
- **Klein-Marcuschamer D, *et al.*** (2010) *De novo* metabolic engineering: The promise of synthetic DNA technology. *Adv Biochem Eng Biotechnol.* 120: 101-31 (by invitation)
- **Klein-Marcuschamer D, *et al.*** (2009) Mutagenesis of the bacterial RNA polymerase alpha subunit for improving complex phenotypes. *Appl Environ Microbiol,* 9: 2705-11 **(Highlighted in ASM News / Microbe July 2009)**
- **Yu H, *et al.*** (2008) A high-throughput screen for hyaluronic acid accumulation in recombinant *E. coli* transformed by libraries of engineered sigma factors. *Biotech and Bioeng*., 101 (4):788-96
- **Fischer C, Klein-Marcuschamer D, Stephanopoulos G** (2008) Selection and optimization of microbial hosts for biofuels production. *Metab. Eng.* 10 (6):295-304.
- **Klein-Marcuschamer D and G Stephanopoulos** (2008) Assessing the potential of mutational strategies to elicit new phenotypes in industrial strains. *Proc. Natl. Acad. Sci. USA*. 105 (7):2319-24
- **Masip L, *et al.*** (2008) Laboratory evolution of Escherichia coli thioredoxin for enhanced catalysis of protein oxidation in the periplasm reveals a phylogenetically conserved substrate specificity determinant. *J Biol Chem.* 283 (2):840-8.
- **Klein-Marcuschamer D, Ajikumar PK, Stephanopoulos G** (2007) Engineering microbial cell factories for biosynthesis of isoprenoid molecules: beyond lycopene. *Trends Biotechnol.* 25 (9):417-24.
- **Stephanopoulos G and Klein-Marcuschamer D** (2008) Transcriptional engineering of *Lactobacillus*. Patent # US 60/959317 – WO/2009/009084
- **Stephanopoulos G, Klein-Marcuschamer D, Alper HS** (2008) Global transcription machinery engineering targeting the RNAP alpha subunit. Patent # US 61/097131 – WO/2009/06142
- **Klein-Marcuschamer D** (2008, 2009) Methods for control of flux in metabolic pathways. Patent US 61/201783 – WO/2010/077806. ***License and ownership assigned to GreenLight Biosciences Inc. for commercialization.***
- **Blake W, Klein-Marcuschamer D** (2012) Cell-free biosynthetic synthesis of small molecules. Provisional Patent US 61/597,209. ***License and ownership assigned to GreenLight Biosciences Inc. for commercialization.***

Scientific Meetings and Presentations

- **Boeing Aero Environmental Summit.** Sydney, Australia. May 2013 (Invited talk)
- **Low Carbon Jet Fuel Conference (@Airshow2013).** Avalon, Australia. Feb. 2013 (Invited talk)
- **Bioenergy Australia**. Melbourne, Australia. Nov. 2012 (Invited talk)
- **The Bioenergy and Bioproducts Symposium**. Brisbane, Australia. Oct. 2012 (Invited talk)
- **Focus the Nation Recharge Retreat.** Mt Hood, USA. Aug. 2012 (Invited talk)
- **DOE Genomic Sciences Meeting.** Bethesda, USA. Feb. 2012 (Poster)
- **Focus the Nation Recharge Retreat.** Mt Hood, USA. Aug. 2011 (Invited talk)
- **American Institute of Chemical Engineers**. Salt Lake City, USA. Nov. 2010 (Talk)
- **Carbon Cycle 2.0 Workshop.** Berkeley, USA. Nov. 2010 (Invited talk)
- **Society of Industrial Microbiology.** San Francisco, USA. August, 2010 (Invited talk)
- **Institute of Chemical and Bioengineering Seminar**. Zurich, Switzerland. July, 2010 (Invited talk)
- **Codexis Guest Lecture.** Redwood City, USA. April, 2010 (Invited talk)
- **American Chemical Society**. San Francisco, USA. March, 2010 (Invited talk and Poster)
- **DOE Genomic Sciences Knowledgebase Workshop**. Arlington, USA. Feb., 2010 (Poster)
- **American Institute of Chemical Engineers**. Philadelphia, USA. Nov. 2008 (Talk)
- **MIT Energy Club Discussion Series.** Cambridge, USA. Oct. 2008 (Invited talk)
- **MIT Algae Group.** Cambridge, USA. May 2008 (Invited talk)
- **Metabolic Engineering VII.** Puerto Vallarta, Mexico. Sept. 2008 (Invited talk and Poster)
- **Intl. Symposium of Frontier Industrial Biotechnology**. Tokyo, Japan. Jan. 2008 (Invited talk)
- **American Institute of Chemical Engineers**. Salt Lake City, USA. Nov. 2007 (Talk)
- **MIT Energy Night.** Cambridge, USA. Oct. 2007 (Poster presentation)
- **European Conference on Biotechnology XIII.** Barcelona, Spain. Sept. 2007 (Invited talk)
- **American Chemical Society.** Boston, USA. Aug. 2007 (Talk)
- **Society of Industrial Microbiology.** Denver, USA. July 2007 (Invited talk)
- **Metabolic Engineering VI**. Noordwijkerhout, Netherlands. Oct. 2006

Media Coverage

- Biofuels Digest (Oct. 2010, Apr. 2012, May 2013)
- Renewable Energy Magazine (Oct. 2010)
- PhysOrg (Oct. 2010)
- ChemInfo (Oct. 2010)
- Ethanol Producer Magazine (Apr. 2012)
- The Age, Melbourne (May 2013)
- Sydney Morning Herald (May 2013)
- Brisbane Times (May 2013)
- The Australian (May 2013)
- Green Car Congress (May 2013)

Miscellany

- Languages: Spanish (native), English (proficient), Portuguese (working competence), Hebrew (basic competence), German (beginner).
- Programming: Matlab, Excel Visual Basic, Python (basic), SuperPro Designer
- Blog: http://pseudocomic.blogspot.com
- Staff at The Tech (MIT official newspaper, Feb. 2007 – present)
- Columnist for the Sidney-Pacific Newsletter (MIT, 2006-07)
- Radio producer and host (UT Austin, Dec. 2003 – May 2005)
- Member of fencing team (UT Austin, 2001)