

KELVIN H. LEE –Gore Professor

Chemical & Biomolecular Engineering Dept.
 Delaware Biotechnology Institute
 15 Innovation Way, Room 281
 University of Delaware
 Newark DE 19711 USA

EDUCATION:

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| Ph.D. Chemical Engineering (minor in Biology) | 4/95 |
| California Institute of Technology | |
| M.S. Chemical Engineering | 4/93 |
| California Institute of Technology | |
| B.S.E. Chemical Engineering and Certificate in Engineering Biology | 6/91 |
| Princeton University | |

PROFESSIONAL EXPERIENCE:

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| Director, Delaware Biotechnology Institute | 9/08-present |
| Gore Professor of Chemical & Biomolecular Engineering, Univ. Delaware | 8/07-present |

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| Professor School of Chemical & Biomolecular Engg, Cornell University | 4/07–8/07 |
| The Samuel C. and Nancy M. Fleming Professor of Molecular and Cell Biology (2005-2007) | |
| Director of the Institute for Biotechnology and Life Science Technologies (2005-2007) | |
| Director of the New York State Center for Life Science Enterprise (2005-2007) | |
| Member, Kavli Institute for Nanoscale Science (2004-2007) | |

Director, Cornell Proteomics Program (2001-2005)
Faculty Director, Cornell Proteomics and Mass Spectrometry Facility (2003-2005)

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| Associate Professor, School of Chemical and Biomolecular Engineering Cornell University | 4/03–4/07 |
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| Assistant Professor, School of Chemical and Biomolecular Engineering Cornell University | 11/97–4/03 |
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| Postdoctoral Scholar, Biology Division, California Institute of Technology | 9/95–10/97 |
| <i>Advisor: Dr. Michael G. Harrington</i> | |

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| Graduate Research Asst. and Research Fellow, Inst. Biotech. Swiss Federal Institute of Technology (Zürich, Switzerland) | 4/93-9/95 |
| <i>Advisor: Professor James E. Bailey</i> | |

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| Graduate Research Asst., Chemical Engineering/Molecular Biotech. California Institute of Technology | 9/91-4/93 |
| <i>NSF Graduate Fellowship</i> | |
| <i>Advisors: Prof. James E. Bailey, Dr. Michael G. Harrington, Prof. Leroy E. Hood</i> | |

HONORS

- National Science Foundation Graduate Fellowship (1991-1994)
- DuPont Young Professor (1999-2002)
- National Science Foundation CAREER Award (1999-2003)
- Invited participant in NSF New Century Scholars workshop, Stanford CA Aug 1-6, 1999
- Invited participant in the National Academy of Engineering Third German-American Frontiers of Engineering Symposium, Bremen, Germany April 13-15, 2000
- J.P. and Mary Barger '50 College of Engineering Excellence in Teaching Award 2000
- MIT *Technology Review* Top 100 Innovators in the World in Business & Technology 2002
- Jay Bailey Young Investigator Best Paper Award in *Metabolic Engineering* 2002
- Camille Dreyfus Teacher-Scholar Award 2003
- Invited participant in the National Academy of Engineering Frontiers of Engineering Symposium, Irvine CA September 17-20, 2003
- Cornell Provost's Ronay and Richard Menschel Award for Distinguished Scholarship 2004.
- Distinguished Professor, NYS Office of Science, Technology and Academic Research 2004.
- Samuel C. and Nancy M. Fleming Professor of Molecular and Cell Biology 2005.
- Gore Professor of Chemical Engineering 2007.
- Invited participant in the National Academy of Engineering Japan-American Frontiers of Engineering Symposium, Kobe Japan November 15-17, 2008.
- Inaugural Winner of the *Biochemical Engineering* Journal Young Investigator Award, 2009.
- Elected Fellow of American Institute of Medical and Biological Engineers, 2010.
- Elected Fellow of American Association for the Advancement of Science, 2011.
- Inaugural Winner of the American Electrophoresis Society Award, 2011.
- *Bioprocess International* Upstream Collaboration of the Decade Finalist, 2012.
- Professional Progress Award for Outstanding Progress in Chemical Engineering, AIChE, 2013.

Recent Peer-Reviewed Journal Publications.

- Liao PY, Choi YS, Dinman J, Lee KH (2011). The many paths to frameshifting: kinetic modelling and analysis of the effects of different elongation steps on programmed -1 ribosomal frameshifting, *Nucleic Acids Research* **39**: 300-312. PMC3017607.
- Shayan G, Choi Y, Shusta EV, Shuler ML, Lee KH (2011). Murine *In vitro* Model of the Blood-Brain Barrier for Evaluating Drug Transport, *European Journal of Pharmaceutical Sciences* **42**: 148-55. PMID: 21078386
- Hammond S, Swanberg JC, Kaplarevic M, and Lee KH (2011). Genomic sequencing and analysis of a Chinese Hamster ovary cell line using Illumina sequencing technology, *BMC Genomics* **12**: 67. PMC3038171.
- Wu CY, Whye D, Glazewski L, Choe L, Kerr D, Lee KH, Mason RW, Wang W (2011). Proteomic assessment of a cell model of Spinal Muscular Atrophy, *BMC Neuroscience* **12**: 25. PMC3063191.
- Shayan G, Shuler ML, Lee KH (2011). The Effect of Astrocytes on the Induction of Blood-Brain Barrier Properties in Aortic Endothelial Cells, *Biotechnology Progress* **27**: 1137-1145. PMID: 21626719
- Xu X, Nagarajan H, Lewis NE, Pan Shengkai, Liu X, Chen W, Xie M, Wang W, Hammond S, Andersen M, Neff N, Passarelli B, Koh W, Lee KH, Betenbaugh MJ, Quake SR, Famili I, Palsson BO, Wang J (2011). The Genomic Sequence of the Chinese Hamster Ovary (CHO) K1 Cell Line, *Nature Biotechnology* **29**: 735-741. PMC3164356.
- Aggarwal K, Lee, KH (2011). Over-expression of cloned *RhsA* sequences perturbs the cellular translational machinery in *E. coli*, *Journal of Bacteriology* **193**: 4869-4880. PMC3165670.

- Wuest D, Hou S, Lee KH (2011). Metabolic Engineering. *Comprehensive Biotechnology*. Elsevier BV. Second Edition, 2011, Vol. 3, 617-628.
- Wu CY, Curtis A, Choi Y, Madae M, Xu MJ, Berg A, Joneja U, Mason RW, Lee KH, Wang W (2011). Identification of the phosphorylation sites in the survival motor neuron protein by protein kinase A, *Biochimica et Biophysica Acta* **1814**: 1134-1139. PMC3124582.
- Rakauskait, Rasa; Liao, Pei-Yu; Rhodin, Michael; Lee, Kelvin; Dinman, Jonathan (2011). A rapid, inexpensive yeast-based dual-fluorescence assay of programmed -1 ribosomal frameshifting for high throughput screening, *Nucleic Acids Research* **39**: e97. PMC3152369.
- Hammond S, Lee KH (2011). RNA Interference of Cofilin in Chinese Hamster Ovary Cells Improves Recombinant Protein Productivity, *Biotechnology and Bioengineering* **109**: 528-535. PMID: 21915848
- Wuest D, Harcum S, Lee KH (2011). Genomics in Mammalian Cell Culture Bioprocessing, *Biotechnology Advances* **30**: 629-638. PMID: 22079893
- Munro S, Choe LH, Zinder S, Lee KH, Walker L (2012). Proteomic and Physiological Experiments to Test *Thermotoga neapolitana* Constraint-Based Model Hypotheses of Carbon Source Utilization, *Biotechnology Progress* **28**: 312-318. PMID: 22034176.
- Wuest D, Lee KH (2012). Optimization of Endothelial Cell Growth in a Murine in vitro Blood-Brain Barrier Model, *Biotechnology Journal* **7**: 409-417. PMCID: PMC3488296
- Hammond S, Kaplarevic M, Borth N, Betenbaugh M, Lee KH (2012). Chinese Hamster Genome Database: An Online Resource for the CHO Community at www.CHOgenome.org, *Biotechnology and Bioengineering* **109**: 1353-1356. PMID: 22105744
- Hammond S, Swanberg J, Polson S, Lee KH (2012). Profiling Conserved MicroRNA Expression in Recombinant CHO Cell Lines Using Illumina Sequencing, *Biotechnology and Bioengineering* **109**: 1371-1375. PMID: 22189905 PMCID: PMC3330154.
- Shayan G, Adamiak B, Relkin NR, Lee KH (2012). Longitudinal Analysis of Novel Alzheimer's Disease Proteomic Cerebrospinal Fluid Biomarkers During Intravenous Immunoglobulin Therapy. *Electrophoresis* **33** 1975-1979. PMID: 22806462
- Valente K, Choe LH, Lenhoff A, Lee KH (2012). Optimization of Protein Sample Preparation for Two-Dimensional Electrophoresis. *Electrophoresis*. **33**: 1947-1957. PMID: 22806459.
- Shayan G, Felix N, Cho Y, Chatzichristidi M, Shuler ML, Ober C, Lee, KH (2012). Synthesis and Characterization of High-Throughput Nanofabricated Poly(4-hydroxy styrene) Membranes for In vitro Models of Barrier Tissue. *Tissue Engineering Part C* **18**: 667-676. PMID: 22435738.
- Gupta P, Swanberg J, Lee KH (2012). A single nucleotide polymorphism in *ydcC* alters tRNA synthetase expression and results in hypersecretion in *Escherichia coli*, *Biotechnology Progress* **28**: 646-653. PMID: 22505047.
- Esposito DV, Forest RV, Chang Y, Gaillard N, McCandless BE, Hou S, Lee KH, Birkmire RW, Chen JG (2012). Photoelectrochemical Reforming of Glucose to Produce H₂ or Syngas using a WO₃-based Tandem Cell Device, *Energy and Environmental Science* **5**: 9091-9099.
- Villamil MA, Liang Q, Chen J, Choi YS, Hou S, Lee KH, Zhuang Z (2012). Serine phosphorylation is critical for the activation of USP1 and its interaction with a WD40-repeat protein UAF1. *Biochemistry*. **51**:9112-23. PMCID: PMC3617561

- Hou S, Jones S, Choe LH, Papoutsakis ET, Lee KH (2013). Workflow for quantitative proteomic analysis of *Clostridia acetobutylicum* ATCC 824 using iTRAQ tags. *METHODS* 61:269-76.
- Wuest DM, Wing AM, Lee KH (2013). Membrane Configuration Optimization for a Murine in vitro Blood-Brain Barrier Model. *J. Neuroscience Methods*. **212**: 211-221. PMID: 23131353
- Choi YC, Hou S, Choe LH, Lee KH (2013). Development of a targeted proteomics method for assay of Alzheimer's disease cerebrospinal fluid biomarkers, *J. Chrom. B*. **930**: 129-135. PMID: 23735279
- Valente K, Schaefer AK, Kempton HR, Lenhoff AM, Lee KH (2013) Method to optimize recovery of Chinese hamster ovary host cell proteins for proteomic analysis. *Biotechnol J*. 9: 87-99.
- Levy N, Valente K, Choe LH, Lee KH, Lenhoff A (2013). Identification and Characterization of Host Cell Protein Product-Associated Impurities in Monoclonal Antibody Bioprocessing. *Biotechnol. Bioeng.* doi: 10.1002/bit.25158.
- Kremkow B, Lee KH (2013). Next-generation Sequencing Technologies and their Potential Impact on CHO Cell-based Biomanufacturing. *Pharmaceutical Bioprocessing*. **1**: 455-465.
- Baik JY, KH Lee (2014). miRNA Expression in CHO: Nature Knows Best. *Biotechnology J*. doi: 10.1002/biot.201300503
- Wuest, DM, KH Lee (2014). Amyloid- β concentration and structure influences the transport and immunomodulatory effects of IVIG. *J. Neurochem*. doi: 10.1111/jnc.12678
- Yuk IM, Zhang JD, Ebeling M, Werz S, Gomez N, Berrera M, Meiringer C, Shao Z, Swanberg J, KH Lee, Luo J, and B Szperalski (2014). Effects of Copper on CHO Cells: Insights from Gene Expression Analyses. *Biotechnology Progress*. 30: 429-442. DOI: 10.1002/btpr.1868
- Tuerk A, KH Lee (2014). The Evolving Engineer. *AIChE Journal* 60: 1956-1963.
- Shayan G, Adamiak B, Choe LH, Relkin NR, and KH Lee (2014). Longitudinal Effects of Intravenous Immunoglobulin on Alzheimer's Cerebrospinal Fluid Proteome. *Electrophoresis*. In press.
- Baik JY, and KH Lee (2014). *Current Opinion in Biotechnology*. In press.