

## BEATRIZ PEÑALVER BERNABÉ, Ph.D.

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### **EDUCATION**

- 2009-2014 **Ph.D. Chemical and Biological Engineering, Northwestern University** (Evanston, IL)  
Dissertation: Dynamic Systems Biology Approaches for Regenerative Medicine  
Advisors: Lonnie D. Shea and Linda J. Broadbelt  
GPA: 3.80/4.0
- 2002-2004 **M.S. Chemical Engineering, University of Massachusetts, Amherst**  
Thesis: Crystallization of Polymers under Biaxial Extensional Flow  
Advisor: H. Henning Winter  
GPA: 3.83/4.0
- 1995-2000 **B.S. Chemical Engineering, University of Murcia** (Spain)  
Minor in Biochemical Engineering and Environmental Engineering  
Final project: Simulation and optimization of a phenol and wate separation plant  
Advisor: Manuel Rubio  
GPA: 9.4/10.0 *Summa cum laude*

### **CAREER EXPERIENCE**

- 2020-Present **University of Illinois at Chicago** (Chicago, IL)  
**Assistant Professor of Bioengineering in Urology College of Medicine** (by courtesy)
- 2019-Present **University of Illinois at Chicago** (Chicago, IL)  
**Assistant Professor Department of Bioengineering College of Medicine**
- 2016-2019 **University of Illinois at Chicago** (Chicago, IL)  
**Visiting Postdoctoral Fellow**, Advisor: Pauline M. Maki
- Conceived and developed a novel line of research to understand the association between perinatal depression and the gut microbiome.
    - a) Led recruiting of pregnant women from economically disadvantaged minority communities as part of an on-going effort of Dr. Pauline Maki to understand perinatal mental health disorders at the University of Illinois at Chicago. This clinical work has been invaluable to provide initial data for governmental funding.
    - b) Managed and trained a team of 20 undergraduate students to recruit participants in clinic and process the biological samples in the lab.
    - c) Computationally established microbial signatures that are related with perinatal depression.
- 2016-2019 **University of Chicago** (Chicago, IL); **University of California San Diego** (La Jolla, CA)  
**Arnold O. Beckman Postdoctoral Fellow**, Advisor: Jack A. Gilbert

- Secured funding to develop and maintained the Perinatal Microbiome Registry (i.e., Arnold O. Beckman Postdoctoral Award 3<sup>rd</sup> year extension and NICHD R03).
- Established microbial communities that lead to obesity in two very distinct populations of female black women from USA and Ghana using 16S rRNA from human and fecal transplant studies in antibiotic treated mice in collaboration with Lara Dugas (Loyola University) and Brian Layden (University of Illinois at Chicago).
- Determined the difference in microbiome composition and structure of different part of the mouse cecum, which are critical after intestinal surgery. Computationally identified amplicon sequences had been experimentally validated in collaboration with John Alverdy (University of Chicago)

2015-2016

**Northwestern University** (Evanston, IL)

**Postdoctoral Fellow**, Advisors: Lonnie D. Shea and Luis A. N. Amaral

- Conceived, wrote and submitted several grants to study the evolution of the gut microbiome during perinatal depression. Successfully secured funding for postdoctoral studies through the Mabel and Arnold Beckman Foundation.

2015

**Northwestern University** (Evanston, IL)

**Adjunct Professor in Chemical and Biological Engineering**

- Taught Molecular and Cell Biology for Engineers

2009-2014

**Northwestern University** (Evanston, IL)

**Research Assistant**, Advisors: Linda J. Broadbelt and Lonnie D. Shea

- Conceived and implemented all the computational efforts to analyze and model dynamic data obtained from a novel high throughput platform, TRACER (transcriptional activity cell arrays) based on bioluminescent reporters. Current applications are in breast cancer and mechano-transduction.
- Established the most likely metabolic, signaling and regulation processes that orchestrate ovarian follicle maturation *in vivo* through several diverse computational methods. Some of the computational predictions regarding *in vitro* ovarian follicle culture media have been successfully validated experimentally in collaboration with Teresa Woodruff (Northwestern University).

2010

**European Bioinformatics Institute (EBI-EMBL)** (Hinxton, UK)

**Research Assistant**, Advisor: Julio Sáez Rodríguez

- Modeled the dynamics of signaling pathways in mammalian cells from phosphorylation data. Improved Boolean methodology with previous knowledge to handle temporal data by using non-linear ordinary differential equations (ODE) and coupling them with the latest methods for parameter estimation and sensitivity analysis in non-linear systems in MATLAB.

2004-2008

**SABIC Innovative Plastics (formerly GE Plastics)** (Mt. Vernon, IN)

**Lead Research and Development Process Engineer**

- Supported and validated the commercial design effort for a \$400MM first-of-its-kind polymer plant. Some major accomplishments include:
  - a) Invented a process to remove catalyst from the final polymer (97% reduction), which increased process robustness and improved polymer final quality. Designed lab set up, performed DOE's, scaled up the invention to a pilot plant, and translated it to the commercial design.
  - b) Designed and scaled up a new formulation (NPI), opening up a new market. Developed a statistical model to control the molecular weight and reduced cycle time by 30%.
- Developed and patented a process (with 20% higher yield and 90% variable cost reduction) to make the key monomer for a new high-heat polymer. Also, reduced investment cost by process simplification, eliminating several steps and pieces of equipment. Reviewed technical proposals from tollers, commissioned the selected tolling facility, and started up production. Executed project from lab to pilot to commercial scale in two years.

- 2002-2004 **University of Massachusetts**, Amherst  
**Research Assistant**, Advisor: Henning Winter
- Studied the effect of biaxial extensional flow, temperature, molecular weight and molecular weight distribution during in-situ polybutene and poly-propylene crystallization using birefringence, X-rays and thermal gravimetric analysis.
- 2000-2002 **GE Plastics** (Cartagena, Spain)  
**Process Engineer**
- Used Six Sigma methodology and plant data mining to increase plant throughput by 25% (to 150% of its original designed capacity) and improved plant stability. Created digital optimization tools (including Aspen models), implemented new plant controls, and solved bottlenecking steps.
  - Led cross-functional effort to develop “Reliability Centered Maintenance” to maximize the number of safe and reliable operational hours per year.
  - Launched process to increase score in Process Safety Management (PSM) audit from 69% to 91%, succeeding especially in management of change and process hazard analysis (100%). Established best practices, translated to other units in the plant, and developed PSM e-training.
  - Developed and validated an Aspen model for a Phenolic Water Separation Unit, which resulted in a \$2MM cost-avoidance for building a new facility. Further used the model for process optimization and reduced the energy usage by \$30K/year.
- 1999 **National Institute of Applied Sciences** (Toulouse, France)  
**Research Assistant**, Advisor: Didier Combes
- Demonstrated the beneficial effect of high pressure on the stability of lipases for application in the pharmaceuticals, cosmetics, and beverage industries.
- 1995-2000 **University of Murcia** (Murcia, Spain)  
**Research Assistant**, Advisor: Manuel Rubio
- Control and optimization of different separation processes such as distillation and liquid-liquid extraction.

## PUBLICATIONS

### In preparation

1. **Peñalver Bernabé, B.**, Dowty, S.M., Pezley, L., Shah, Z., Hill, E., Gottel, N., Gibbons, R. Tussing-Humphreys, L., Maki, P.M., and Gilbert J.A. Depression during pregnancy is associated with an altered gut microbiome.
2. **Peñalver Bernabé, B.**, Dowty, S.M., Pezley, L., Shah, Z., Hill, E., Gottel, N., Gibbons, R. Tussing-Humphreys, L., Maki, P.M., Gilbert J.A., and Mary M. Kimmel, Stress and anxiety are correlated with an altered gut microbiome and immune system.
3. **Peñalver Bernabé, B.**, and Gilbert J.A. Dynamic core taxonomical and metabolic signatures in the perinatal period.
4. Koenig, M.D., Tussing-Humphreys, L., **Peñalver Bernabé, B.**, Man, B. Gestational Diabetes Mellitus and Gut Microbiome

\*co-authors contributed equally to this work

## Submitted

- Zaborin, A.\*, **Peñalver Bernabé, B.\***, Sharma, A., Hyoju, S., Gottel, N., Gilbert, J.A., Zaborina, O., and Alverdy, J.C. Disturbance of crypt/lumen compositional and functional compartmentalization in cecal microbiota by a major surgery

## Published

- Weiss, M.S., **Peñalver Bernabé, B.**, Bellis, A.D., Broadbelt, L.J., Jeruss, J.S., and Shea, L.D. Dynamic, large-scale profiling of transcription factor activity from live cells in 3D culture. *Plos One*, 5, e14026, doi:10.1371/journal.pone.0014026 (2010).
- Bellis, A.D., **Peñalver Bernabé, B.**, Weiss, M.S., Yarrington, M.E., Barbolina, M.V., Pannier, A. K., Jeruss, J.S., Broadbelt, L.J., and Shea, L.D. Cellular arrays for large-scale analysis of transcription factor activity. *Biotechnol Bioeng*, 108, 395-403, doi:10.1002/bit.22916 (2011).
- MacNamara, A., Terfve, C., Henriques, D., **Peñalver Bernabé, B.**, and Saez-Rodriguez, J. State-time spectrum of signal transduction logic models. *Phys. Biol*, 9(4), 045003, doi: 10.1088/1478-3975/9/4/045003 (2012).
- Weiss, M.S., **Peñalver Bernabé, B.**, Shikanov, A., Bluver, D.A., Mui, M.D., Shin, S., Broadbelt, L. J., and Shea, L.D. The impact of adhesion peptides within hydrogels on the phenotype and signaling of normal and cancerous mammary epithelial cells. *Biomaterials*, 33(13), 3548-3559, doi: 10.1016/j.biomaterials.2012.01.055 (2012).
- Bellis, A.D., **Peñalver Bernabé, B.**, Weiss, M.S., Shin, S., Weng, S., Broadbelt, L.J., and Shea, L.D. Dynamic transcription factor activity profiling in 2D and 3D cell cultures. *Biotechnol Bioeng*, 110, 563-572, doi:10.1002/bit.24718 (2013).
- Skory, R.M.\*, **Peñalver Bernabé, B.\***, Galdones, E.\*, Broadbelt, L.J., Shea, L.D., and Woodruff, T.K. Microarray analysis identifies COMP as the most differentially regulated transcript throughout in vitro follicle growth. *Mol Reprod Dev*, 80(2), 132-144, doi: 10.1002/mrd.22144 (2013).
- Mutharasan, P., Galdones, E., **Peñalver Bernabé, B.\***, Garcia, O.A., Jafari, N., Shea, L.D., Woodruff, T.K., Legro, R.S., Dunaif, A., and Urbanek, M. Evidence for chromosome 2p16.3 Polycystic ovary syndrome susceptibility locus in Affected Women of European Ancestry. *J Clin Endocrinol Metab*, 98(1), E185-90, doi: 10.1210/jc.2012-2471 (2013).
- Tagler, D., Makanji, Y., Tu, T., **Peñalver Bernabé, B.**, Lee, R., Zhu, J., Kniazeva, E., Hornick, J.E., Woodruff, T.K., and Shea, L.D. Promoting extracellular matrix remodeling via ascorbic acid enhances the survival of primary ovarian follicles encapsulated in alginate hydrogels. *Biotechnol Bioeng*, 111, 1417-1429, doi:10.1002/bit.25181 (2014).
- Weiss, M.S., **Peñalver Bernabé, B.\***, Shin, S., Asztalos, S., Dubbury, S.J., Mui, M.D., Bellis, A.D., Bluver, D., Tonetti, D.A., Saez-Rodriguez, J., Broadbelt, L.J., Jeruss, J.S., and Shea, L.D. Dynamic transcription factor activity and networks during ErbB2 breast oncogenesis and targeted therapy. *Integr Biol (Camb)*, 6, 1170-1182, doi:10.1039/c4ib00086b (2014).
- Tarasewicz, E., Rivas, L., Hamdan, R., Dokic, D., Parimi, V., **Peñalver Bernabé, B.**, Thomas, A., Shea, L.D., and Jeruss, J.S. Inhibition of CDK-Mediated Phosphorylation of Smad3 Results in Decreased Oncogenesis in Triple Negative Breast Cancer Cells. *Cell Cycle*, 13(20), 3191-3201, doi: 10.4161/15384101.2014.950126 (2014).
- Peñalver Bernabé, B.**, Shin, S., Rios, P.D., Broadbelt, L.J., Shea, L.D., and Seidlits, S.K. Dynamic transcription factor activity networks in response to independently altered mechanical and adhesive microenvironmental cues. *Integr Biol (Camb)*, 8, 844-860, doi:10.1039/c6ib00093b (2016).
- Dugas, L.R., **Peñalver Bernabé, B.\***, Priyadarshini, M., Fei, N., Park, S.J., Brown, L., Plange-Rhule, J., Nelson, D., Toh, E.C., Gao, X., Dong, Q., Sun, J., Kliethermes, S., Gottel, N., Luke, A., Gilbert, J.A., and Layden, B.T. Decreased microbial co-occurrence network stability and SCFA receptor level correlates with obesity in African-origin women. *Sci Rep*, 8 (1), 17135, doi: 10.1038/s41598-018-35230-9 (2018).
- Decker, J.T., Hall, M.S., **Peñalver Bernabé, B.**, Blaisdel, R.B., Liebman, L.N., Jeruss, J.S., and Shea, L.D. Design of large-scale reporter construct arrays for dynamic, live cell systems biology. *ACS Synth Biol*, 7 (9), 2063–2073, doi: 10.1021/acssynbio.8b00236 (2018).
- Peñalver Bernabé, B.**, Cralle, L., and Gilbert, J.A. Systems Biology of the Human Microbiome. *Curr Opin Biotechnol*, 51, 146-153, doi: 10.1016/j.copbio.2018.01.018 (2018).

20. **Peñalver Bernabé, B.**, Tussing-Humphreys, L., Rackers, H.S., Welke, L., Mantha, A., and Kimmel, M.C. Improving Mental Health for the Mother-Infant Dyad by Nurturing the Maternal Gut Microbiome. *Gastroenterol Clin North Am.* 48(3):433-445. doi: 10.1016/j.gtc.2019.04.007 (2019)
21. **Peñalver Bernabé, B.**, Thiele, I., Galdones, E., Siletz, A., Woodruff, T.K., Broadbelt, L.J., and Shea, L.D. Dynamic genome-scale cell-specific metabolic models reveal novel inter-cellular and intra-cellular metabolic communications during ovarian follicle development. *BMC Bioinformatics*, 10;20(1):307. doi: 10.1186/s12859-019-2825-2 (2019)
22. Fei, N., **Peñalver Bernabé, B.**, Lie, L., Baghdan, D., Plange-Rhule, J., Forrester, T.E., Lambert, E.V., Bovet, P., Gottel, N., Riesen, W., Wolfgang, K., Luke, A., Kliethermes, S.A, Layden, B.T., Gilbert, J.A., and Dugas, L.R. The human microbiota is associated with cardiometabolic risk across an epidemiologic transition. *PLoS One*, 24;14(7):e0215262. doi: 10.1371/journal.pone.0215262 (2019)
23. **Peñalver Bernabé, B.**, Woodruff, T.K., Broadbelt, L.J., and Shea, L.D. Ligands, receptors and transcription factors that mediate inter-cellular and intra-cellular communication during ovarian follicle development (in press, *Reproductive Science*, 2019)
24. **Peñalver Bernabé, B.**, Maki, P.M., Dowty, S.M., Cralle, L., Salas, M., and Gilbert, J.A. Precision Medicine in perinatal major depression disorders in light of the Human Microbiome (in press, *Psychopharmacology*, 2019)

\*co-authors contributed equally to this work

## PATENTS

1. **Peñalver Bernabé, B.**, Gopalakrishnan, V., Kloppenburg, L.M., Kuhlman, M., Odle, R.R., Pressman, E.J., Ramesh, N., and Singh, H. (2010). Methods for preparing oxydiphthalic anhydrides, oxydiphthalic anhydrides prepared thereby, and polyetherimides derived therefrom. United State Patent, 7,674,920.
2. Pressman, E.J., Stella, A.S., **Peñalver Bernabé, B.**, Kloppenburg, L.M., and Bergman, L.H. (2011). Method for purifying dianhydrides. United State Patent, 7,863,463.
3. **Peñalver Bernabé, B.**, Gopalakrishnan, V., Kloppenburg, L.M., Kuhlman, M., Odle, R.R., Pressman, E.J., Ramesh, N., and Singh, H. (2011). Method for purifying dianhydrides, the dianhydrides formed thereby, and polyetherimides formed therefrom. United State Patent, 8,013,173.
4. **Peñalver Bernabé, B.**, Guggenheim, T.L., Hall, D.B., Johnson, N., Rodriguez Ordoñez, J.J., and Woodruff, D. (2013). Method for purification of polyether polymers and mixtures resulting therefrom. United State Patent 8,372,941
5. Rodriguez Ordoñez, J.J., Guggenheim, T.L., **Peñalver Bernabé, B.**, Hemmer, G.L., and Odle, R.R. (2015). Polyetherimides, methods of manufacture, and articles formed therefrom. United State Patent 9,193,829.

## INVITED PRESENTATIONS

1. **Peñalver Bernabé, B.** Implications of the female microbiome in obesity and perinatal depression. Oakton Community College, Des Plaines, Illinois (November, 2019)
2. **Peñalver Bernabé, B.** Human Microbiome in Health and Disease. Nutrition and Microbiome Symposium, Chicago, Illinois (October, 2019)
3. **Peñalver Bernabé, B.** Genomics and Microbiome, interconnections to health and obesity studies. Computational Life Sciences Seminar Series (CLSSS), Chicago, Illinois (January, 2018)
4. **Peñalver Bernabé, B.**, Amaral, L.A.N., Maki, P.M., Gilbert, J.A. Could the microbiome be a novel target to treat perinatal depression? University of Illinois Center for Depression and Resilience Monthly Meeting Chicago, Illinois (March 2017)
5. **Peñalver Bernabé, B.**, Galdones, E., Siletz, A., Thiele, I., Skory, R., Urbanek, M., Woodruff, T.K., Broadbelt, L.J., Shea, L.D. Elucidating molecular mechanisms during ovarian follicle development. Society for the Study of Reproduction Annual Meeting, San Diego, California (July 2016)

**ORAL PRESENTATIONS**

1. **Peñalver Bernabé, B.**, Dowty, S.M., Pezley, L., Shah, Z., Hill, E., Gottel, N., Gibbons, R. Tussing-Humphreys, L., Maki, P.M., and Gilbert J.A. Host immunity, metabolome, gut microbiome and pregnancy depression. MONA, Chapel Hill, North Carolina (October, 2019)
2. **Peñalver Bernabé, B.**, Dowty, S.M., Pezley, L., Shah, Z., Hill, E., Gottel, N., Gibbons, R. Tussing-Humphreys, L., Maki, P.M., and Gilbert J.A. Antenatal Depression is associated with an altered gut microbiome and immune system. Women and Their Microbiomes, Hamilton, Canada (March, 2019)
3. **Peñalver Bernabé, B.**, Galdones, E., Woodruff, T. K., Broadbelt, L. J., Shea, L. D. Dynamic modeling of the murine oocyte and somatic cell metabolome during follicle development. Society for the Study of Reproduction Annual Meeting, San Diego, California (July 2017)
4. **Peñalver Bernabé B.\***, Weiss, M. S.\*, Shin, S., Dubbery S. J., Mui, M., Broadbelt L. J., Jeruss J. S., Shea L. D. Systems biology approach for the analysis of the cellular dynamics of ErbB2 signaling in 3D during tissue morphogenesis using transduced cell arrays. RECOMB, Toronto, Canada (November 2013)
5. **Peñalver Bernabé, B.\***, Seidlits, S.\*, Broadbelt, L.J., Shea, L.D. A large-scale, real-time array to assess dynamic changes in intracellular signaling in response to biomaterial-mediated mechanical and adhesive stimuli. AIChE, San Francisco, CA, USA (November 2013)
6. **Peñalver Bernabé, B.\***, Weiss, M.S.\*, Shin, S., Dubbery, S.J., Mui, M., Broadbelt, L.J., Jeruss, J.S., Shea, L.D. Systems biology approach for the analysis of the cellular dynamics of ErbB2 signaling in 3D during tissue morphogenesis using transduced cell arrays. AICHE (November 2013)

\*co-authors contributed equally to this work

**POSTER PRESENTATIONS**

1. **Peñalver Bernabé, B.**, Dowty, S.M., Pezley, L., Shah, Z., Hill, E., Gottel, N., Gibbons, R. Tussing-Humphreys, L., Maki, P.M., and Gilbert J.A. Antenatal depression is associated with an altered gut microbiome. National Depression Network Centers, Ann Arbor, Michigan (October, 2019)
2. **Peñalver Bernabé, B.**, Dowty, S.M., Pezley, L., Shah, Z., Hill, E., Gottel, N., Gibbons, R. Tussing-Humphreys, L., Maki, P.M., and Gilbert J.A. Antenatal depression is associated with an altered gut microbiome. Society of Biological Psychiatry Annual Meeting, Chicago, USA (May, 2019)
3. **Peñalver Bernabé, B.**, Dowty, S.M., Pezley, L., Shah, Z., Hill, E., Gottel, N., Gibbons, R. Tussing-Humphreys, L., Maki, P.M., and Gilbert J.A. Antenatal depression is associated with an altered gut microbiome and immune system. Society for Reproductive Investigation Annual Meeting, Paris, France (March, 2019)
4. **Peñalver Bernabé, B.**, and Gilbert J.A. Dynamic core taxonomical and metabolic signatures in the perinatal period. Society for Reproductive Investigation Annual Meeting, Paris, France (March, 2019)
5. **Peñalver Bernabé, B.\***, Dugas, L. R.\*, Priyadarshini, M., Fei, N., Park, S. J., Brown, L., Plange-Rhule, J., Gao, X., Dong, Q., Nelson, D., Fiehn, O., Luke, A., Sun, J., Gilbert, J.A., Layden, B.T. Increased microbial co-occurrence network stability and SCFA receptor activity, not fecal short chain fatty acid concentration, correlates with protection against obesogenic challenge in mice. International Human Microbiome Conference, Ireland (June 2018)
6. **Peñalver Bernabé, B.**, Dowty, S. M., Pezley, L., Fernandez, A., Go, J., Hassan, M., Shah, Z., Shaheen, S., Labomascus, B., Tussing-Humphreys, L., Maki, P.M., Gilbert J.A. Human Microbiome and Perinatal Depression. 8th Annual Research Forum Extravaganza (September 2017)
7. **Peñalver Bernabé, B.**, Galdones, E., Woodruff, T. K., Broadbelt, L.J., Shea L.D. Ligands, receptors and transcription factors that mediate inter-cellular and intra-cellular communication during ovarian follicle development. Society for the Study of Reproduction Annual Meeting, San Diego, California (July 2017)
8. **Peñalver Bernabé, B.\***, Dugas, L. R.\*, Plange-Rhule, J., Priyadarshini, M., Park, S. J., Brown, L., Gao, X., Nelson, D., Fiehn, O., Luke, A., Sun, J., Gilbert, J.A., Layden, B.T. Microbiome induced obesity is not associated with changes in small chain fatty acid production. Chicago Microbiome Center Research Symposium (April 2017)

9. **Peñalver Bernabé, B.\***, Weiss, M. S.\*, Shin, S., Dubbery, S.J., Mui M., Broadbelt, L.J., Jeruss, J.S., Shea, L.D. Systems biology approach for the analysis of the cellular dynamics of ErbB2 signaling in 3D during tissue morphogenesis using transduced cell arrays. Chicago Biomedical Consortium Annual Symposium, Chicago, IL, USA (October 2013)
10. **Peñalver Bernabé, B.**, Galdones, E., Siletz, A., Woodruff, T. K., Broadbelt, L. J., Shea, L. D. Systems ovarian folliculogenesis. Oncofertility Consortium Conference. Chicago, IL, USA (September 2013)
11. **Peñalver Bernabé, B.\***, Weiss, M. S.\*, Shin, S., Dubbery, S. J., Mui, M., Broadbelt, L. J., Jeruss, J.S., Shea, L.D. Systems biology approach for the analysis of the cellular dynamics of ErbB2 signaling in 3D during tissue morphogenesis using transduced cell arrays. Systems Biology of Diversity in Cancer Memorial Sloan Kettering Cancer Center, New York, NY, USA (October 2012)
12. **Peñalver Bernabé, B.\***, Weiss, M. S.\*, Shin, S., Dubbery, S. J., Mui, M., Broadbelt, L. J., Jeruss, J. S., Shea, L.D. Systems biology approach for the analysis of the cellular dynamics of ErbB2 signaling in 3D during tissue morphogenesis using transduced cell arrays. National Centers for Systems Biology Meeting University of Chicago, Chicago, IL, USA (July 2012)
13. **Peñalver Bernabé, B.\***, Weiss, M.S.\*, Shin, S., Dubbery, S. J., Mui, M., Broadbelt, L.J., Jeruss, J.S., Shea L.D. Analysis of ErbB2 signaling in 3D during tissue morphogenesis and therapeutic treatment using transduced cell arrays. Systems Biology Conference Cold Spring Harbor Laboratories, Long Island, NY, USA (March 2012)
14. Galdones, E.\* , **Peñalver Bernabé, B.\***, Lei, L., Broadbelt, L.J., Shea, L.D., Woodruff, T.K. Cartilage oligomeric matrix protein and folliculogenesis: a potential biomarker for proper antral follicle development in the mouse. Specialized Cooperative Centers Program in Reproduction and Infertility Research Steering Committee Meeting Chicago, IL, USA (May 2011)
15. **Peñalver Bernabé, B.\***, Galdones, E.\* , Lei, L., Kiesewetter, S.E., Jozefik, J.K., Jackson, E., Broadbelt, L.J., Woodruff, T.K., Shea, L.D. Identification of developmental markers and targets to enhance in vitro ovarian follicle culture. Oncofertility Consortium Conference. Chicago, IL, USA (September 2010)

\*co-authors contributed equally to this work

## **HONORS & AWARDS**

- Larry Ewing Memorial Trainee Travel Fund (LEMTTF) 50<sup>th</sup> Annual Meeting of the Society for the Study of Reproduction in Washington D.C. (2017)
- Postdoctoral Fellowship Award from the Mabel and Arnold Beckman foundation (2016-2019)
- Identified as one of 30 young future technological leaders in US and invited to attend ThinkChicago, a symposium to meet technological leaders in the Chicago area (October 2014)
- Distinguished Graduate Student Award by the Chemical and Biological Engineering Department, Northwestern University (2013)
- NIH-NIGM Biotechnology Training Award (2009-2011)
- Nominated as High Performing Lead Professional (only 25 per year across GE worldwide) in 2007
- Awarded best Chemical Engineer by the Spanish Government (2001)
- Awarded best Chemical Engineer by the University of Murcia (2000)
- Erasmus Fellowship by the European Union (1999)
- Top student each semester in Chemical Engineering, similar to Dean's list (1995-200)

## **OUTREACH & SERVICES**

### **Professional Meetings**

- Chair of the Chicago-area Microbiome during Pregnancy and Infant Development Symposium, MIMoS (2017, 2018, 2020)
- Member of the organization committee for the Chicago Microbiome Center Research Symposium (April 2017)
- Chair of the Thodos-Hulburt Professional Development Symposium (July 2013)

**Professional Services**

- Reviewer mSystems since 2016
- Reviewer Psychopharmacology since 2018
- Reviewer PLOS One since 2019

**Professional Societies**

- Member of Perinatal Mental Health Society since 2017-2018
- Member of the Society for Science and Reproduction since 2016-2017

**Outreach Academic Activities**

- “Introduction to Human Microbiome” presentations at public schools (Skinner North, Downers Grove North)
- Video to increase awareness of perinatal depression and maternal gut microbiome (2017)
- Volunteer at Cancer Smasher Educational Event at Northwestern University (January 2015)
- Volunteer at Science Pentathlon in Chute Middle School (April 2013)
- Science Fair Judge at Lincoln Park High School Chicago (December 2012)

**FUNDING****Current funding**

1 R03 HD095056-01 (Maki, Gilbert)	09/01/18-08/31/20	1.2 Cal Months
National Institute of Child Health and Human Development		\$100,000

*Human Microbiome and Perinatal Depression*

Up to 75% of women diagnosed with depression during pregnancy and the postpartum receive adequate treatment, in large part due to concerns about the safety of antidepressants. A feasibility study in preparation for a larger study to determine whether women with depression during their pregnancy and after their delivery have alterations in the bacterial communities in their intestine. Identifying which bacteria are associated with depression is a critical first step in the development of safe probiotic treatments for depression during pregnancy. Location: University of Illinois at Chicago and University of Chicago

Role: Co-I

Postdoctoral Fellowship Award (Penalver Bernabe)	09/01/16-08/31/19	10.0 Cal Months
Arnold and Mabel Beckman Foundation		\$196,056

*Evolution of the Human Microbiome during Perinatal Depression*

Study the associations between the human gut microbiome and the neuroimmunoendocrine systems and perinatal depression by recruiting a longitudinal cohort of 100 from a low-income minority group of urban women. Location: University of Chicago

Role: PI

**Completed funding**

NIGM Biotechnology Training Grant (Penalver Bernabe)	08/01/10-07/31/12	12.0 Cal Months
<i>Dynamic Systems Biology applications in Regenerative Medicine</i>		

Biological processes are dynamic in nature with very different time scales, from seconds, e.g., signaling, to days or months, such as tissue development. While there are multiple dynamic systems biology approaches for signaling there are applicable to understand long term biological process common in regenerative medicine. In general, regenerative medicine experiments are long and cannot be sampling at a high frequency. In this project. I propose to develop novel dynamic statistical and computational methods to understand diverse applications in regenerative medicine, as the progress and treatment breast cancer and the metabolism and signaling of ovarian follicle maturation.

Location: Northwestern University

Role: Principal Investigator



## **TEACHING EXPERIENCE**

### **Adjunct Professor**

- Molecular and Cell Biology for Engineers, Northwestern University (2015)

### **Teaching Assistant**

- Process optimization, Northwestern University (2012)
- Polymerization reaction engineering, Northwestern University (2012)
- Statistics for engineers, Northwestern University (2010)
- Process economics, design, and evaluation, Northwestern University (2009)
- Process design, University of Massachusetts (2004)

## **MENTORING EXPERIENCE**

### **University of Illinois at Chicago (Chicago, IL)**

1. Agatha Fernandez, student in the College of Nursing (2016-2018)
2. Shapla Shaheen, student in the College of Nursing (2016-2018)
3. Saraah Na'Allah, undergraduate student in the Department of Neuroscience (2016-2017)
4. Erykah Harris, student in the College of Nursing (2016-2018)
5. Naveen Siddiqui, B.A. in Applied Psychology and Gender and Women's Studies (2016)
6. Hira Choudhry, B.S. Neuroscience (2016-2018)
7. Mir Hassan, undergraduate student in Department of Biological Science (2017-2018)
8. Jane Go, undergraduate student in Department of Biological Science (2017-2019)
9. Mennat Gharib, undergraduate student in Department of Biological Science (2017-2019)
10. Zainab Shah, undergraduate student in Department of Biological Science (2017-2020)
11. Maria Aguilar, undergraduate student in Department of Psychology, Disability and Human Development (2017-2018)
12. Rafia Ali, undergraduate student in Department of Biological Sciences (2017-2020)
13. Brianna David, undergraduate student in the Department of Neuroscience (2018-2019)
14. Brittany Beard, undergraduate student in Department of Biological Science (2018-2019)
15. Zana Van Der Smissen, undergraduate student in Department of Psychology (2018)
16. Jordan Baroni, M.D./Ph.D. student (2018)
17. Julia Camardo, undergraduate student in Department of Psychology (2018)
18. Unathi Nageli, undergraduate student in the Department of Neuroscience (2018-2019)
19. Jessaly John, undergraduate student in the Department of Biology (2018-2019)
20. Marina Isaac, undergraduate student in the Department of Biology (2018-2019)
21. Tanmayi Kadamuddi, undergraduate student in the Department of Biology (2018-2020)
22. Mia Bakis, undergraduate student in the Department of Neuroscience (2018-2020)
23. Lucy Schiller, undergraduate student in the Department of Neuroscience (2018-2020)
24. Ashwin Koppayi, master student in the Department of Bioengineering (2020)
25. Akansha Khedekar, master student in the Department of Bioengineering (2020)
26. Andrea Oak, undergraduate student in the Department of Bioengineering (2020)
27. Malik Nusairat, undergraduate student in the Department of Bioengineering (2020)
28. Joann Chan, undergraduate student in the Department of Computer Science (2020)
29. Shivani Senguttuvan, undergraduate student in the Department of Bioengineering (2020)
30. Medina Kazimi, visiting undergraduate student in the Department of Bioengineering from Oakton Community College, IL (2020)

### **University of Chicago (Chicago, IL)**

31. Alexandra Sjaarda, undergraduate in the Department of Biological Sciences (2016-2017)
32. Beatrice Farb, high school student attending Walter Payton College Prep (2016-2017)
33. Allison Lettiere, high school student attending Walter Payton College Prep (2016-2017)
34. Paul Pachwicewicz, M.S. in Biomedical Informatics (2016-2017)

**Northwestern University** (Evanston, IL)

- 35. Lana Kammerer, B.S. in Chemical and Biological Engineering Department (2013)
- 36. Dennis Bluver, M.S. in the Chemical and Biological Engineering Department (2010-2012)
- 37. Matt Shaxted, B.S. in Chemical and Biological Engineering Department (2010-2011)
- 38. Alvin Kuo, B.S. in Chemical and Biological Engineering Department (2010-2011)

**TRAININGS & CERTIFICATIONS**

- Management for Scientists and Engineers, Kellogg School of Management, Northwestern University (2013)
- Six Sigma Green Belt Certification; trainer for DFSS & DMAIC (2001)
- Environmental Management ISO 14000 (2001)
- Process Hazard Analysis (HAZOP and SWIFT) by Det Norske Veritas (2001)
- Languages: English (Fluent) and Spanish (Fluent)

**REFERENCES**

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