Todd M. Przybycien

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Date of Birth: 19 August 1962, Clarkson, New York
Citizenship: United States of America

Education

California Institute of Technology, Pasadena, CA

6/86 - 3/89 Ph.D. in Chemical Engineering with Minor in Biology
Advisor: Prof. James E. Bailey
Thesis: "Structure, Function and Aggregation Kinetics in Salt-Induced Protein Precipitation" (1989) *Diss. Abst. Int. B* **50**, 2057.

9/84 - 6/86 M.S. in Chemical Engineering
Advisor: Prof. James E. Bailey

Washington University, St. Louis, MO

9/80 - 5/84 B.S. in Chemical Engineering, cum laude
9/80 - 5/84 A.B. in Chemistry, magna cum laude

Positions and Employment

Carnegie Mellon University, Pittsburgh, Pennsylvania

7/02 – Professor of Biomedical Engineering and Chemical Engineering
7/02 – 7/08 Founding Head, Biomedical Engineering Department
7/00 – 6/02 Head, Biomedical & Health Engineering Program
1/00 – 6/02 Associate Professor of Biomedical & Health Engineering
6/98 – 6/02 Associate Professor of Chemical Engineering

Rensselaer Polytechnic Institute, Troy, New York

6/96 – 5/98 Howard P. Isermann Associate Professor of Chemical Engineering
1/91 – 5/96 Howard P. Isermann Assistant Professor of Chemical Engineering

Monsanto Agricultural Company, St. Louis, Missouri

3/89 – 12/90 Senior Research Engineer, Purification Process Development Group, Animal Sciences Division,

Other Experience and Professional Memberships

2010 – 2012 Managing Board Member, Society for Biological Engineering
2005 Member, NIH ZRG1 BCMB-R 50 S Nanotechnology Special Emphasis Panel
2005 – Scientific Advisory Board, International Conference on BioPartitioning and Purification
2002 – 2005 Past Chair, Chair, 1st Vice-Chair, 2nd Vice-Chair of American Institute of Chemical Engineers Division 15: Food, Pharmaceutical and Biochemical Engineering
2002 – Member, American Society for Engineering Education
2000 – 2002 Associate Editor, *Biotechnology & Bioengineering*
1997 – Editorial Board Member, *Separation Science and Technology*
1989 – Member, American Association for the Advancement of Science
1984 – Member, American Institute of Chemical Engineers
1983 – Member, American Chemical Society

Consulting

Alza Corporation, Palo Alto, CA, Biopharm Implant R&D; Amgen, Inc., Thousand Oaks, CA, Recovery Process Engineering; Asahi Kasei Bioprocess, Inc., Chicago, IL; Biogen Idec, Inc., Cambridge, MA; Genetics Institute (Pfizer), Andover, MA, Drug Product Development Group; Genzyme Transgenics, Framingham, MA; Inhale Therapeutic Systems, San Carlos, CA, Research and Development Group; Merck Research Laboratories, West Point, PA, BioProcess R&D Group; Protein Design Labs, Inc., Mountain View, CA, Product Development; Protiva Division of Monsanto (Pharmacia/Pfizer), St. Louis, MO, Purification Process Development

Honors

2010	Elected Fellow of the American Institute of Chemical Engineers
2009	Erskine Fellow, University of Canterbury, Department of Chemical and Process Engineering, Christchurch, NZ
2009, 2007	Outstanding Carnegie Mellon BME Professor, Graduate BioMedical Engineering Society
2008 –	Adjunct Professor of Biotechnology, Departamento Biotecnología e Ingenieria de Alimentos, Instituto Tecnologico y de Estudios Superiores de Monterrey, Monterrey, MX
1998	Elected Fellow of the American Institute for Medical and Biological Engineering
1997	Early Career Award, Faculty of Rensselaer Polytechnic Institute
1997	Camille Dreyfus Teacher-Scholar Award, Dreyfus Foundation
1995	Faculty Early Career Development Award, National Science Foundation

Current Research Interests

Prof. Przybycien's group is interested in the area of applied biophysics - addressing the practical problems and underlying fundamental phenomena associated with the production, formulation, and delivery of pharmaceutical proteins generated by the biotechnology industry. The focus is on protein denaturation, aggregation and adsorption phenomena that are probed on the molecular level with spectroscopic, optical and biophysical tools and then connected to studies of macroscopic, process-level behavior. This work has frequently involved the development of new experimental tools, apparati and techniques. Molecular-level/process level connections are made with mechanistic models, molecular simulations and informatics tools. The overall goal is the development of structure-processing relationships that improve our ability to design and operate processes, formulations and delivery devices. Another portion of Prof. Przybycien's group is involved in the development of tissue reflectance spectroscopy-based sensors for the early detection of pressure ulcers and in the use of surfactants to enhance pulmonary drug delivery.

Selected Recent Publications

Koch K, Dew B, Corcoran T, Przybycien T, Tilton R, Garoff S (2011) "Surface Tension Gradient Driven Spreading on Aqueous Mucin Solutions: A Possible Route to Enhanced Pulmonary Drug Delivery," *Molecular Pharmaceutics* **8**, 387-394.

Pai SS, Przybycien TM, Tilton RD (2010) "Protein PEGylation Attenuates Adsorption and Aggregation on a Negatively Charged and Moderately Hydrophobic Polymer Surface," *Langmuir* **26**, 18231-18238.

Ahmad MM, Hauan S, Przybycien TM (2010) "Flowsheet Simulation of Aqueous Two-Phase System for Protein Extraction", *Journal of Chemical Technology and Biotechnology* **85**, 1575-1587.

Daly S, Przybycien TM, Tilton RD (2007) "Aggregation of lysozyme and of poly(ethylene glycol)-modified lysozyme after adsorption to silica," *Colloids and Surfaces B: Biointerfaces* **57**, 81-88.

Cisneros-Ruiz M, Mayolo-Deloisa K, Przybycien TM, Rito-Palomares M (2009) "Separation of PEGylated from Unmodified Ribonuclease A using Sepharose HIC Media," *Separation and Purification Technology*, 65, 105-109.

Pai SS, Tilton RD, Przybycien TM (2009) "Poly(ethylene glycol)-Modified Proteins: Implications for Poly(lactide-co-glycolide)-Based Microsphere Delivery," *American Association of Pharmaceutical Science Journal*, **11**(1), 88-98.

Gaspard S, Przybycien TM, Seigel M (2008) "Skin Color Compensated Colorimeter for Detection and Classification of Pressure Ulcers," Proceedings of the IEEE International Instrumentation and Measurement Technology Conference (I^2MTC 2008).

Xiao Y, Jones TT, Laurent AH, O'Connell JP, Przybycien TM, Fernandez E (2007) "Protein Instability During HIC: Hydrogen Exchange Labeling Analysis and a Framework for Describing Mobile and Stationary Phase Effects," *Biotechnology and Bioengineering* **96**, 80-93.