

## **1. INFORMACIÓN PERSONAL:**

NOMBRE: ZIOMARA PATRICIA GERDTZEN HAKIM  
CÉDULA DE IDENTIDAD O RUN: 12.884.029-K  
LUGAR Y FECHA DE NACIMIENTO: 13.DE Septiembre de 1975  
NACIONALIDAD: CHILENA ESTADO CIVIL: Casada  
TÍTULOS O GRADOS ACADÉMICOS: Ingeniero Civil en Biotecnología  
CARGO ACTUAL EN LA U. DE CHILE: Académico  
DEPARTAMENTO: Ingeniería Química y Biotecnología  
FACULTAD O INSTITUTO: Facultad de Ciencias Físicas y Matemáticas  
TIPO DE JORNADA Y NOMBRAMIENTO: Jornada Completa  
JERARQUÍA ACADÉMICA ACTUAL: Profesor Asociado  
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## **2. ESTUDIOS REALIZADOS :**

1994 – 1997 Universidad de Chile, Licenciado en en Cs. de la Ingeniería, Mención Biotecnología  
1994 – 2000 Universidad de Chile, Ingeniero Civil en Biotecnología, “Purificación de Plasmidios Utilizando Sistemas de Dos Fases Acuosa”  
2000 – 2005 University of Minnesota, Ph.D. Ingeniería Química, “Modeling, Analysis and Theoretical Exploration of the Metabolism of Mammalian Cells in Culture”

### **2.1. ACTIVIDADES DE PERFECCIONAMIENTO:**

Jul-Dic 1998 “Biotecnología Industrial”, impartido por la Fundación Ciencia para la Vida. En este curso se discutieron diferentes oportunidades de aplicación de la biotecnología en el desarrollo de productos de aplicación industrial en Chile, en áreas tales como la industria forestal, agropecuaria y acuícola, entre otras.  
Junio 13-16, 2005 “Advanced Course in Cellular Bioprocess Technology”, Minneapolis, MN. Intensive short course is for engineers, cell biologists, and scientists interested in state-of-the-art cell culture technology. Course participants are introduced to the rationale behind the selection, operation and design of cell culture reactors and to overall process design and optimization.

## **4. BREVE CRONOLOGÍA LABORAL :**

Tras obtener mi título de Ingeniero Civil en Biotecnología, comencé mis estudios de Doctorado en la Universidad de Minnesota. Para mi trabajo de tesis Doctoral me desempeñé como Research Assistant en el grupo de cultivo de células animales del Dr. Wei-Shou Hu y el grupo de Control del Dr. Prodromos Daoutidis. Adicionalmente fui Teaching Assistant en varios cursos de pre y postgrado del Department of Chemical Engineering and Materials Science de la University of Minnesota, a cargo de laboratorios y recitations. En 2006 me incorporé como académico del Departamento de Ingeniería Química y Biotecnología, donde además de realizar docencia para las carreras de Ingeniería Química y Biotecnología, estoy iniciando mi investigación en cultivo de células animales y desarrollo de modelos matemáticos para sistemas biológicos.

## **5. ACTIVIDADES ACADÉMICAS :**

2006-2007 Profesor de cátedra: IQ40A Análisis de procesos, IQ56A Operaciones de Transferencia II, BT740A Biología de sistemas y genómica funcional, BT31B Biología Celular, BT69E Introducción al Trabajo de Título. Departamento de

Ingeniería Química y Biotecnología, Facultad de Cs. Físicas y Matemáticas, Universidad de Chile.

2001-2005 Teaching Assistant, Department of Chemical Engineering and Materials Science, University of Minnesota: Process Control (Undergraduate Class and Laboratory), Applied Mathematics I – Linear Análisis (Graduate Class), Introduction to Biomolecular Engineering (Undergraduate Class), Systems Análisis of Biological Processes (Graduate Class).

### 5.1. INVESTIGACION:

1999-2000 Universidad de Chile, Facultad de Cs. Físicas y Matemáticas, Departamento de Ingeniería Química, CIByB. Estudiante memorista. Tema: “Utilización de sistemas de dos fases acuosas para la purificación de plasmidios”.

2001-2005 University of Minnesota, Department of Chemical Engineering and Materials Science.

Tema: “Nonlinear Model Reduction”, Financiamiento: American Chemical Society-Petroleum Research Fund.

Tema: “Mammalian Cell Culture and Metabolism Modeling”, Financiamiento: BioTechnology Institute, University of Minnesota; Merck.

2006 Universidad de Chile, Facultad de Cs. Físicas y Matemáticas, Departamento de Ingeniería Química, CIByB. CoInvestigador Proyecto Fondecyt 1061119, Metabolic engineering for the optimization of metabolism in yeast and mammalian cells: Mathematical modeling and genomic studies.

2007 Universidad de Chile, Facultad de Cs. Físicas y Matemáticas, Departamento de Ingeniería Química, CIByB. Investigador Principal Proyecto Iniciación INI 60/04-2, Caracterización de los parámetros de cultivo para células animales: Optimización, modelamiento y análisis genómico contextualizado.

## 8. DIFUSIÓN Y COMUNICACIONES :

### 8.1.1. LIBROS Y MONOGRAFÍAS.

1. Gerdtzen, Z. P., 2006, Modeling, analysis and theoretical exploration of the metabolism of mammalian cells in culture (Paperback), ProQuest / UMI, ISBN: 0542310368, 218 p.

### 8.1.4. REVISTAS INTERNACIONALES:

1. Gerdtzen, Z. P., Daoutidis, P. & Hu, W.-S., 2004, Nonlinear reduction for kinetic models of metabolic reaction networks, *Met. Eng.*, 6 (2): 140-154 (**ISI, 3.397**).

2. Gerdtzen, Z. P., Daoutidis, P. & Hu, W.-S., 2005, Nonlinear reduction for dynamic descriptions of metabolic networks with multiple time-scales, *Biotech. Prog.*, Submitted.

### 8.3. PONENCIAS A CONGRESOS.

#### 8.3.1. Sometidas a referato y publicadas in extenso.

1. Gerdtzen, Z. P., Daoutidis, P. & Hu, W.-S., 2005, Nonlinear model reduction for metabolic networks with multiple time scales, in: *Proceedings of the 13th Mediterranean Conference on Control and Automation* (Limassol, Cyprus, June 27-29, 2005).

2. Gerdtzen, Z. P., Daoutidis, P. & Hu, W.-S., Nonlinear model reduction of metabolic networks using time-scale analysis, in: *Proceedings of the American Control Conference* pp 2867-2872 (Anchorage, Alaska, May 8-10, 2002).

#### 8.3.3. Otras ponencias internacionales.

1. Gerdtzen, Z. P., Daoutidis, P. & Hu, W.-S., Modeling energy metabolism networks: a reduction approach, *ACS-American Chemical Society, National meeting, Division of*

- Biochemical Technology, Bioprocess Monitoring and Control*. Boston MA, August 18-22, 2002.
2. Gerdtzen, Z. P., Daoutidis, P. & Hu, W.-S., Reducing the complexity of kinetic models of metabolic networks, United Engineering Foundation Conference, *Metabolic Engineering IV: Applied System Biology*. Il Ciocco, Castelvechio Pascoli, Italy, October 6-11, 2002 (poster).
  3. Gerdtzen, Z. P., Daoutidis, P. & Hu, W.-S., Reducing the complexity of kinetic models of metabolic networks: a time-scale approach, *AICHE, American Institute of Chemical Engineering, Food, Pharmaceutical & Bioengineering Division, Modeling and Operation Methods in Biosystems*. Indianapolis IN, November 3-8, 2002.
  4. Hu, W.-S., Korke, R, de Leon Gatti, M., Gerdtzen, Z., and Daoutidis, P., Integrating system analysis and large scale gene expression profiling in mammalian cell culture engineering, *EMCC-3 - 3rd Chemical Engineering Conference for Collaborative Research in Eastern Mediteranean*. Thessaloniki, Greece, May 14-16, 2003.
  5. Hu, W.-S., Rink, A., Daoutidis, P., de Leon Gatti, M., Gerdtzen, Z.P., Hossler, P., Narayanan, R. A., Wlaschin, K., Wong, K., Philip, R. J., Sanny, A., Tan, K. S., Ong, P.F., Nissom, P. M., Lo, S.L., Chew, Y.C., Lim, K.M., Wong, C.F., and Yap, M., Integrating genomic exploration and systems analysis in mammalian cell culture engineering, *International Symposium on Bioprocess and Biomolecular Engineering, East China University of Science and Technology (ECUST)*. Shanghai, China, May 25-28, 2003.
  6. Gerdtzen, Z. P., Daoutidis, P. & Hu, W.-S., Reduction of nonlinear kinetic models of metabolic networks with multiple time scales, *AICHE, American Institute of Chemical Engineering, Food, Pharmaceutical & Bioengineering Division, Modeling and Operation Methods in Biosystems*. San Francisco CA, November 16-21, 2003.
  7. Gerdtzen, Z. P., de Leon Gatti, M., Lee, J., & Daoutidis, P., & Hu, W.-S., Identification of Target genes for Cell Engineering Via a Metabolic Model, *United Engineering Foundation Conference, Cell Culture Engineering IX*, Cancun, Mexico, March 7-12, 2004 (poster).
  8. Gerdtzen, Z. P., Lee, J., de Leon Gatti, M., & Daoutidis, P., & Hu, W.-S., Dissecting the Mechanism of Metabolic Shift in Mammalian Cell Culture by Mathematical Modeling, *12th International Biotechnology Symposium*, Santiago de Chile, Chile, October 17-22, 2004 (poster).
  9. Gerdtzen, Z. P., Yee, J. C., Wlaschin, K. F., Nissom, P. M., Yap, M., & Hu, W.-S., Large Scale Comparative Transcription Profiling on Temperature Shift in Cell Culture, *12th International Biotechnology Symposium, Santiago de Chile*, Chile, October 17-22, 2004.
  10. Hossler, P., Gerdtzen, Z. P., & Hu, W.-S., Visualization of glycoform distribution for the optimization of antibody producing CHO cells, *AICHE, American Institute of Chemical Engineering*, Austin TX, November 7-12, 2004.
  11. Yee, J. C., Wlaschin, K. F., Gerdtzen, Z. P., Nissom, P. M., Yap, M., & Hu, W.-S., Functional Annotation of CHO ESTs Through A Combination of Sequence Homology and Comparative Gene Expression Profiling, *AICHE, American Institute of Chemical Engineering*, Austin TX, November 7-12, 2004.
  12. Wlaschin, K. F., J Yee, J. C., Gerdtzen, Z. P., Kantardijeff, A., McIvor, R. S., & Hu, W.-S., Engineering cell metabolism for process enhancement, *ACS, American Chemical Society*, San Diego, CA, March 13-17, 2005.
  13. Gerdtzen, Z. P., Lee, J., & Hu, W.-S. Exploring the effect of nutrient perturbations in mammalian cell culture by mathematical modeling, *ACS, American Chemical Society*, San Diego, CA, March 13-17, 2005.

14. Gerdtzen, Z. P., Daoutidis, P. & Hu, W.-S., 2005, Nonlinear model reduction for metabolic networks with multiple time scales, *13th the Mediterranean Conference on Control and Automation*, Limassol, Cyprus, June 27-29, 2005.
15. Gerdtzen, Z. P., Lee, J. & Hu, W.-S., 2005, Exploring the effect of nutrient perturbations in mammalian cell culture by mathematical modeling, *4th Annual Medical Alley/MNBIO Conference & Expo*, St. Paul, Minnesota, October 5 & 6 (poster).
16. Yee, J. C., Gerdtzen, Z. P., Wlaschin, K. F., Philip, R. J., Yap, M., & Hu, W.-S., 2005, Large Scale Comparative Transcription Profiling on Stress-induced Culture, *4th Annual Medical Alley/MNBIO Conference & Expo*, St. Paul, Minnesota, October 5 & 6 (poster).
17. Gerdtzen, Z. P., de Leon Gatti, M., Lee, J. & Hu, W.-S., Study of the Effect of Enzyme and Amino Acid Transport Perturbations for Mammalian Cells in Culture via a Mathematical Model, United Engineering Foundation Conference, Cell Culture Engineering X, Whistler, Vancouver, Canada, April 23-28, 2006 (poster).
18. Gerdtzen, Z. P., Salgado, J. C., Zuñiga, F., Andrews, B. A., & Asenjo, J. A., A Metabolic Model for the Optimization of Adenoviral Vector Production, United Engineering Foundation Conference, Metabolic Engineering VI, Noordwijkerhout, Netherlands, October 1-5, 2006 (poster).