

## NECMETTIN YILDIRIM

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EDUCATION	<b>PhD, Applied Mathematics</b> , 1996-2000 Ataturk University, Erzurum, Turkey <b>Dissertation:</b> Kinetic and metabolic control analysis of multi enzymes systems in biochemistry by combination of symbolic and numerical computation techniques <b>Supervisor:</b> Prof. Mustafa Bayram <b>MSc, Applied Mathematics</b> , 1993-1996 Dumlupinar University, Kutahya, Turkey <b>Thesis:</b> Dimension reduction by principle components analysis in multivariate data analysis and an application <b>Supervisor:</b> Prof. Ibrahim Guney <b>BSc, Mathematics Education</b> , 1987-1992 Middle East Technical University, Ankara, Turkey
PROFESSIONAL EXPERIENCE	<b>Postdoctoral Fellow</b> , 2003-Present Department of Mathematics University of North Carolina at Chapel Hill Supervisor: Prof. Timothy C Elston <b>Postdoctoral Fellow</b> , 2001-2002 Center for Nonlinear Dynamics in Physiology and Medicine McGill University, Canada Supervisor: Prof. Michael C Mackey <b>Research Assistant</b> , 1998-2001 Computer Sciences Application and Research Center Ataturk University, Turkey <b>Mathematics Instructor</b> , 1992-1998 Aziziye and Yavuz Selim Colleges, Turkey
RESEARCH INTERESTS	Nonlinear dynamical systems, time delay differential equations, symbolic computation and computer algebra, mathematical biology, cellular signal transduction and enzyme kinetics.
TEACHING EXPERIENCE	<b>Instructor</b> , UNC Mathematics Department • Spring 2005, Introduction to Differential Equations, full course responsibility

- Fall 2004, Linear algebra and its applications, full course responsibility
- Fall 2003, Calculus of functions of one variable, full course responsibility

**Instructor**, Aziziye and Yavuz Selim collages

- I taught several sections of algebra, calculus, trigonometry and analytic geometry courses between 1992-1998

**JOURNAL  
PUBLICATIONS**

1. Regulation of MAP kinase specificity by protein tyrosine phosphatase: Experimental and computational analysis of signaling fidelity in yeast (In preparation).  
Joint work with Elston TC, Dohlman, HG and Hao, N.
2. Steady state analysis of biochemical reaction networks: Computer algebra approach (In preparation). Joint work with Elston T.C.
3. Analysis and validation of MAPK signaling in yeast (In preparation).  
Joint work with Elston TC, Dohlman, HG and Hao, N.
4. **Yildirim, N.**(2005) Use of symbolic and numeric computation techniques in analysis of biochemical reaction networks, *International Journal of Quantum Chemistry*, In press for January 2006 Issue.
5. **Yildirim, N.**, Santillan, M., Horike, D., and Mackey, M. C. (2004) Dynamics and bistability in a reduced model of the lac operon, *Chaos*, 14(2), 279-292.
6. Mackey, M.C., Santillan, M. and **Yildirim, N.** (2004) Modeling operon dynamics: The tryptophan and lactose operons as paradigms, *Comptes Rendus Biologies*, 327(3), 211-224.
7. Subasi, M., **Yildirim, N.** and Yildiz, B. (2004) An improvement on Fibonacci search method in optimization theory, *Applied Mathematics and Computation*, 147(3), 893-901.
8. Hao, N., **Yildirim, N.**, Wang, Y.Q., Elston, T.C. and Dohlman, H.G.(2003) Regulators of G protein signaling and transient activation of signaling: Experimental and computation analysis reveals negative and positive feedback controls on G protein activity, *Journal of Biological Chemistry*, 278(47), 46506-46515.
9. **Yildirim, N.** and Mackey, M.C.(2003) Feedback regulation in the lactose operon: A mathematical modeling study and comparison with experimental data, *Biophysical Journal*, 84(5), 2841-2851.
10. **Yildirim, N.**, Akcay, F., Okur, H. and Yildirim, D. (2003) Parameter estimation of nonlinear models in biochemistry: A comparative study on optimization methods, *Applied Mathematics and Computation*, 140(1), 29-36.
11. **Yildirim, N.**, Ankaralioglu, N., Yildirim, D. and Akcay, F. (2003) Application of Grobner basis theory to derive rate equations for enzyme catalyzed reactions with two or more substrates or products, *Applied Mathematics and Computation*, 137(1), 67-76.
12. **Yildirim, N.** (2002) Quasi-steady state kinetics of simple sequential multienzyme reactions with single substrates, *Journal of Mathematical Chemistry*, 32(3), 271-280.
13. **Yildirim, N.**, Ciftci, M. and Kufrevioglu, O.I. (2002) Kinetic analyses of multi enzyme systems: A case study of creatine kinase- hexokinase and glucose 6-

- phosphate dehydrogenase, *Journal of Mathematical Chemistry*, 31(1), 121-130.
14. Bayram, M., Simsek, H. and **Yildirim, N.** (2002) Automatic calculation of Alexander polynomials of (3,k)-torus knots, *Applied Mathematics and Computation*, 136(2-3), 505-510.
  15. **Yildirim, N.** and Bayram, M. (2000) Derivation of conservation relationships for metabolic networks using Maple, *Applied Mathematics and Computation*, 112(2-3), 255-263.
  16. **Yildirim, N.** and Bayram, M. (2000) Analysis of the kinetics of unstable enzymatic systems using Maple, *Applied Mathematics and Computation*, 112(1), 41-48.
- BOOK CHAPTER**
1. **Yildirim, N.**, Hao, N., Dohlman, H.G. and Elston, T.C. (2004) Mathematical Modeling of RGS and G Protein Regulation in Yeast, *Methods in Enzymology*, v.389, 383-398, Academic Press, New York.
- INVITED TALKS**
1. **Yildirim, N.** (2004) Some uses of computer algebra in enzyme kinetics, *228<sup>th</sup> American Chemical Society National Meeting*, August 22-26, Philadelphia, PA, USA.
- PRESENTATIONS**
1. **Yildirim, N.**, Yetiskin, H. and Bayram, M. (2001) Automatic derivation of conservation relationships for metabolic pathways: A Maple Program, *Mathematical Modeling and Scientific Computing: An international Conference*, April 2-6, Ankara-Konya, Turkey.
  2. **Yildirim, N.**, Bayram, M., Ciftci, M. and Kufrevioglu, O.I. (2000) Sembolik ve nümerik metotlarla çok enzimli bağlı sistemlerin kinetiklerinin incelenmesi, *Ulusal Kimya Kongresi*, 10-15 Eylül, Dicle Üniversitesi, Diyarbakir, Turkey.
  3. **Yildirim, N.** and Bayram, M. (2000) Symbolic and numeric computations in kinetic analysis of multi enzyme systems in biochemistry, *2<sup>nd</sup> World Conference On Mathematics and Computers in Physics*, Vouliagmeni, July 10-15, Greece.
- POSTERS**
1. **Yildirim, N.**, Hao, N., Dohlman, H.G. and Elston, T.C. (2004) Mathematical Modeling of G-Protein Signaling Pathway in Yeast, *Gordon Research Conference*, June 4-11, Tilton school, NH, USA.
  2. **Yildirim, N.**, Horike, D. and Mackey, M.C. (2002) Regulation of Lactose Operon: A Mathematical modeling study, *MITACS Third Annual General Meeting*, May 23-25, University of British Columbia, Vancouver, Canada.
  3. **Yildirim, N.**, Mackey, M.C. (2002) Dynamics and bistability in the lactose operon: A mathematical modeling and comparison with experimental data, *First SIAM Conference on Life Sciences*, April 11-13, Boston, MA, USA.
  4. **Yildirim, N.** (2001) Application of Grobner bases theory to derive steady state rate equations in biochemical kinetic theory, *Maple Application Center* (online at <http://adept.maplesoft.com/>).
- AWARDS AND HONORS**
- Research grant of \$9800 from The Scientific and Technical Research Council of Turkey under the NATO grant program.
  - Research award of \$1000 from The Scientific and Technical Research Council of Turkey. This award is given for publishing paper in refereed international journals.

- Student-Employee Fellowship from The Scientific and Technical Research Council of Turkey, 1988 -1989.
- Honor degree during undergraduate study.

**LANGUAGES**

- Turkish (native)
- English

**COMPUTER SKILLS**

- **OPERATING SYSTEMS/LANGUAGES**  
Unix, Dos, Windows, Fortran, Maple, Basic and Matlab.
- **OTHERS**  
LaTeX, Microsoft Office and other Windows applications.

**REFERENCES**

Professor **Michael C. Mackey**  
Centre for Nonlinear Dynamics in Physiology and Medicine  
McGill University, Canada  
Email : mackey@cnd.mcgill.ca  
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