

# RAYMOND CHEONG

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## Education

- 2002-Present    **Johns Hopkins University**, Baltimore, MD  
MD-PhD candidate with MSTP (Medical Scientist Training Program) appointment  
PhD advisor: Dr. Andre Levchenko, Dept. of Biomedical Engineering
- 2002            **University of Maryland**, College Park, MD  
B.S. Chemical Engineering, *summa cum laude*  
Certificate in biochemical engineering  
University Honors Citation

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## Professional Activities

### *Research Experience*

- 2003-present    Dept. of Biomedical Engineering, **Johns Hopkins University**, Baltimore, MD  
PhD candidate, advisor Dr. Andre Levchenko
- Integrate computer modeling and microfluidic experiments to study dynamics of the NF- $\kappa$ B transcription factor in response to inflammation
  - To date, this work has resulted in five publications, a book chapter, two oral presentations at conferences, and a patent application
- 1999-2002      Dept. of Chemistry & Biochemistry, **University of Maryland**, College Park, MD  
Undergraduate research fellow, advisor Dr. Jason Kahn
- Modeled effect of DNA-protein interactions on DNA topology, using Monte Carlo methods
  - This work resulted in two publications, including a paper in *Biophysical Journal*
- Summers 1996-1998    Dept. of Pathology, **Johns Hopkins University**, Baltimore, MD  
Research assistant, advisor Dr. Gary Pasternack
- Studied interactions between the oncogene myc and the cancer-related protein pp32 (research during high school)
  - Won semifinalist in the 1998 Westinghouse Science Talent Search
  - Won 4th place Grand Award in Biochemistry, 1998 Intel International Science & Engineering Fair

### *Teaching Experience*

- Spring 2007      Dept. of Biomedical Engineering, **Johns Hopkins University**, Baltimore, MD  
Teaching Assistant for 580.223: Biological Models and Simulation with Matlab
- Fall 2006            Teaching Assistant for 510.312: Physical Chemistry of Materials I: Thermodynamics
- Summer 2001      Dept. of Chemical Engineering, **University of Maryland**, College Park, MD  
Teaching Assistant for ENCH250: Computer Methods in Chemical Engineering
- Fall 2000            Teaching Assistant for ENCH300: Chemical Engineering Thermodynamics

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## Publications

### Papers

1. **R Cheong**, A Hoffmann, A Levchenko. "Understanding NF-kappaB signaling via mathematical modeling." *Molecular Systems Biology*. 4:192 (2008).
2. **R Cheong**, A Levchenko. "Wires in the soup: quantitative models of cell signaling." *Trends in Cell Biology*. 18(3):112-8 (2008).
3. A Kaneda, CJ Wang, **R Cheong**, W Timp, P Onyango, B Wen, CA Iacobuzio-Donahue, R Ohlsson, R Andraos, MA Pearson, AA Sharov, DL Longo, MS Ko, A Levchenko, AP Feinberg. "Enhanced sensitivity to IGF-II signaling links loss of imprinting of IGF2 to increased cell proliferation and tumor risk." *Proceedings of the National Academy of Sciences (USA)*. 104(52):20926-31 (2007).
4. **R Cheong**, RK Wilson, I Cortese, DE Newman-Toker. "Mothball withdrawal encephalopathy: case report and review of paradichlorobenzene neurotoxicity." *Substance Abuse*. 27(4):63-7 (2006).
5. **R Cheong**, A Bergmann, S Werner, A Hoffmann, A Levchenko. "Transient IkappaB kinase activity mediates temporal NF-kappaB dynamics in response to a wide range of tumor necrosis factor-alpha doses." *Journal of Biological Chemistry*. 281(5):2945-50 (2006).
6. JD Kahn, **R Cheong**, RA Mehta, LM Edelman, MA Morgan. "Flexibility and control of protein-DNA loops." *Biophysical Reviews and Letters*. 1(4):327-41 (2006).
7. D Barken, CJ Wang, J Kearns, **R Cheong**, A Hoffmann, A Levchenko. "Comment on 'Oscillations in NF-kappaB signaling control the dynamics of gene expression'." *Science*. 308(5718):52 (2005).
8. LM Edelman, **R Cheong**, JD Kahn. "Fluorescence resonance energy transfer over approximately 130 basepairs in hyperstable lac repressor-DNA loops." *Biophysical Journal*. 84(2 Pt 1):1131-1145 (2003).

### Book Chapters

1. **R Cheong**, A Levchenko. "Survey of the NF-kappaB Transcription Factor: Function, Structure, Regulation, Pathways, and Applications." *Encyclopedia of Molecular Cell Biology and Molecular Medicine*, 2nd edition. Wiley-VCH: New York, 2005.

### Conferences

1. CJ Wang\*, **R Cheong\***, A Levchenko. "Microfluidic device for high-throughput immunofluorescent staining of signaling proteins in attachment-dependent cells." 10th International Conference on Miniaturized Systems for Chemistry and Life Sciences ( $\mu$ TAS2006). \*Equal contribution from these authors. **Selected for oral presentation** (session 4A2, given by CJW). Tokyo, Japan (Nov 5 2006 – Nov 9 2006).
2. **R Cheong**, CJ Wang, A Levchenko. "Towards systems-level understanding of NF- $\kappa$ B signaling through integrated modeling and experimentation." Keystone Symposia, NF- $\kappa$ B: 20 Years on the Road from Biochemistry to Pathology. **Selected for oral presentation**. Banff, Canada. (Mar 23 2006 – Mar 28 2006).

3. **R Cheong**, A Bergmann, A Hoffmann, A Levchenko. “The IkappaB-NFkappaB Signaling Module: Signal Downregulation Is Required for Initial Response to TNFalpha.” Foundations of Systems Biology in Engineering. Santa Barbara, CA, USA (Aug 7 2005 – Aug 10 2005).
4. **R Cheong**, A Bergmann, A Levchenko. “Using similarity metrics in robustness analysis of a NF-kappaB model.” Workshop on Genomic Signal Processing and Statistics (GENSIPS). Baltimore, MD, USA (May 26 2004 – May 27 2004)
5. JD Kahn, LM Edelman, **R Cheong**, RA Mehta. “Analysis and control of protein-DNA loops.” American Chemical Society, 226th Annual Meeting. New York, NY, USA (Sep 07 2003 – Sep 11 2003).
6. M Morgan, L Edelman, **R Cheong**, R Mehta, J Kahn. “Design and analysis of hyperstable protein-DNA loops and nanostructures.” Greater Washington Area Nanoscience Open House, University of Maryland. College Park, MD, USA. (Oct 25 2001)
7. **R Cheong**, JR Brody, L Lee, GR Pasternack. “Phosphoprotein 32 (pp32) inhibits c-myc transactivation and transformation.” American Association for Cancer Research (AACR), 90th Annual Meeting. Philadelphia, PA, USA. (Apr 10 1999 – Apr 14 1999)
8. J Bai, SS Kadkol, **R Cheong**, JR Brody, M Chamberlin, GR Pasternack. “Cell-type specific suppression of human prostate carcinoma cell proliferation by a novel tumor suppressor, pp32.” American Association for Cancer Research (AACR), 90th Annual Meeting. Philadelphia, PA, USA. (Apr 10 1999 – Apr 14 1999)

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## Honors

### *Scholarships and Fellowships*

2002-present	Medical Scientist Training Program appointment at Johns Hopkins University
2001	American Institute of Chemical Engineers Othmer National Scholarship
2000-2002	Howard Hughes Medical Institute Undergraduate Research Fellowship
1998-2002	University of Maryland Banneker/Key Scholarship (highest academic scholarship)

### *Awards*

2004	North American Winner, Biotechnology Young Entrepreneurs Scheme
2002	A. James Clark School of Engineering Dean’s Award
2000, 2001	Winner, International Obfuscated C Code Contest
1999	Ranked among top 300 students nationwide, 1999 Putnam Mathematical Exam
1998	Fourth Place Grand Award, Biochemistry, Intel International Science & Engineering Fair
1998	Semifinalist, Westinghouse Science Talent Search

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## Personal Activities

2005-present	Founder, Baltimore County Math League and ARML Team <ul style="list-style-type: none"> <li>• Created, piloted, and expanded a new extracurricular mathematics activity for public high schools in Baltimore County, MD.</li> </ul>
2002-present	Archivist, Student-authored medical school notes <ul style="list-style-type: none"> <li>• Curate an extensive collection of student-authored or student-recommended resources for medical education</li> </ul>
1999-present	Men’s college basketball computer rankings <ul style="list-style-type: none"> <li>• Created a mathematical formula to robustly rank basketball teams based on scores and game locations. Rankings are published online.</li> </ul>

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## Skills

- **Computational modeling:** parameter fitting, deterministic and stochastic differential equations, sensitivity analysis
- **Lab on a chip:** multi-layer microfluidic devices, microfluidic cell culture, microfluidic device automation
- **Experimental biology:** high content image analysis, Western blot, quantitative RT-PCR, immunocytochemistry, mRNA in situ hybridization, yeast two-hybrid, recombinant DNA, tissue culture
- **Computer programming:** Matlab, Mathematica, C, Fortran, UNIX, HTML, CSS

(Version: 07 May 2008)