

Dennis L. Chao

Curriculum vitae

January 11, 2012

PERSONAL DATA

Dennis L. Chao
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EDUCATION

1994	B.S.E. in Computer Science Princeton University • Princeton, NJ
2004	Ph.D. in Computer Science The University of New Mexico • Albuquerque, NM Dissertation: <i>Modeling the cytotoxic T cell response</i>

POSTGRADUATE TRAINING

10/2004–6/2008	Postdoctoral fellow Fred Hutchinson Cancer Research Center • Seattle, WA Supervisors: Brian Reid, Georg Luebeck, and Li Hsu
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FACULTY POSITIONS HELD

12/2011–present	Senior staff scientist Fred Hutchinson Cancer Research Center • Seattle, WA
7/2008–12/2011	Staff scientist Fred Hutchinson Cancer Research Center • Seattle, WA

TEACHING RESPONSIBILITIES

2009–present	Instructor I taught half of the material for <i>Stochastic Simulation Methods for Infectious Diseases</i> , a 2.5-day module at the Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington.
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PROFESSIONAL ACTIVITIES

- 3/2012 **Reviewer**
I will be one of four reviewers of the EU-sponsored EPIWORK consortium, which funds twelve research groups in eight countries (www.epiwork.eu).
- 1/2012 **Consultant**
I will present and moderate at the *First meeting on typhoid transmission, intervention, disease burden and cost-effectiveness/cost-utility modeling* at the World Health Organization's headquarters in Geneva. The meeting will cover statistical and modeling approaches to estimating the burden of typhoid and the cost-effectiveness of interventions.
- 1/2012–present **Advisory board member**
The University of Washington's Center for Ecogenetics and Environmental Health's mission is to study and communicate how genetic factors influence human susceptibility to environmental health risks. As a member of the advisory board of its Community Outreach and Ethics Core, I will help plan events to discuss the Center's work, science in the news, and ethics with the general public.
- 9/2011 **Consultant**
I participated in the *WHO consultation on oral cholera vaccine stockpile strategic framework* at the World Health Organization's headquarters in Geneva. A mobile stockpile of cholera vaccine could be used to mitigate or prevent cholera outbreaks in the underdeveloped and developing world.
- 9/2010 **Symposium organizer**
I organized a VIDD and NIGMS co-sponsored symposium and workshop on influenza, *The Future of Flu*, at the Fred Hutchinson Cancer Research Center. We invited eight out-of-state participants and many local experts to give talks and participate in discussions about influenza from public health, evolutionary, and statistical perspectives.
- 10/2007 **Symposium organizer**
I organized a symposium on systems biology, *Biological networks: From measurements to modeling*, at the Fred Hutchinson Cancer Research Center. The eight speakers discussed the computational tools for systems biology as well as new laboratory techniques relevant to the field.
- 2007 **Colloquium organizer**
I was a member of the committee that organized the *2007 FHCRC Ethics Colloquium*. We invited one outside speaker and several local experts to participate in talks and to lead discussions on scientific misconduct.

MANUSCRIPTS IN REFEREED JOURNALS

** indicates the five most significant publications*

- * 1. **Chao DL**, Bloom JD, Kochin BF, Antia R, Longini IM Jr. The global spread of drug-resistant influenza. *Journal of the Royal Society Interface*; In press.
2. Kenah E, **Chao DL**, Matrajt L, Halloran ME, Longini IM Jr. The global transmission and control of influenza. *PLoS ONE*. 2011;6(5):e19515. PMID: PMC3089626.
3. **Chao DL**, Matrajt L, Basta NE, Sugimoto JD, Dean B, Bagwell DA, Oifulstad B, Halloran ME, Longini IM Jr. Planning for the control of pandemic influenza H1N1 in Los Angeles County and the United States. *Am J Epidemiol*. 2011;173(10):1121–30. PMID: PMC3121321.
- * 4. **Chao DL**, Halloran ME, Longini IM Jr. Vaccination strategies for epidemic cholera in Haiti with implications for the developing world. *Proc Natl Acad Sci U S A*. 2011; (17):7081–5. PMID: PMC3084143.
5. Wang P, **Chao DL**, Hsu L. Learning oncogenic pathways from binary genomic instability data. *Biometrics*. 2011;67(1):164-73. PMID: PMC3020238.
6. **Chao DL**, Halloran ME, Longini IM Jr. School opening dates predict pandemic influenza A (H1N1) epidemics in the United States. *J Infect Dis*. 2010;202(6):877–80. PMID: PMC2939723.
- * 7. **Chao DL**, Halloran ME, Obenchain V, Longini IM Jr. FluTE, a publicly available stochastic influenza epidemic simulation model. *PloS Computational Biology*. 2010; 6(1):e1000656. PMID: PMC2813259.
- * 8. Yang Y, Sugimoto JD, Halloran ME, Basta NE, **Chao DL**, Matrajt L, et al. The transmissibility and control of pandemic influenza A (H1N1) virus. *Science*. 2009;326(5953): 729–733. PMID: PMC2880578.
9. Basta NE, **Chao DL**, Halloran ME, Matrajt L, Longini IM Jr. Strategies for pandemic and seasonal influenza vaccination of school children in the US. *Am J Epidemiol*. 2009;170:679–686. PMID: PMC2737588.
10. Paulson TG, Maley CC, Li X, Li H, Sanchez CA, **Chao DL**, Odze RD, Vaughan TL, Blount PL, Reid BJ. Chromosomal instability and copy number alterations in Barrett's esophagus and esophageal adenocarcinoma. *Clin Cancer Res*. 2009;15(10):3305–3314. PMID: PMC2684570.
- * 11. **Chao DL**, Eck JT, Brash DE, Maley CC, Luebeck EG. Pre-neoplastic lesion growth driven by the death of adjacent normal stem cells. *Proc Natl Acad Sci U S A*. 2008;105(39):15034–15039. PMID: PMC2567488.
12. **Chao DL**, Sanchez CA, Galipeau PC, Blount PL, Paulson TG, Cowan DS, Ayub K, Odze RD, Rabinovitch PS, Reid BJ. Cell proliferation, cell cycle abnormalities, and cancer outcome in patients with Barrett's esophagus: A long-term prospective study. *Clin Cancer Res*. 2008 Nov 1;14(21):6988–95. PMID: PMC2587072.
13. **Chao DL**, Maley CC, Wu X, Farrow DC, Galipeau PC, Sanchez CA, Paulson TG, Rabinovitch PS, Reid BJ, Spitz MR, Vaughan TL. Mutagen sensitivity and neoplastic progression in patients with Barrett's esophagus: A prospective analysis. *Cancer Epidemiol Biomarkers Prev*. 2006 Oct;15(10):1935–40.

14. **Chao DL**, Davenport MP, Forrest S, Perelson AS. The effects of thymic selection on the range of T cell cross-reactivity. *Eur J Immunol*. 2005 Nov 14;35(12):3452–3459. PMID: PMC1857316.
15. Davenport MP, Ribeiro RM, **Chao DL**, Perelson AS. Predicting the impact of a non-sterilizing vaccine against human immunodeficiency virus. *J Virol*. 2004 Oct;78(20):11340–51. PMID: PMC521856.
16. **Chao DL**, Davenport MP, Forrest S, Perelson AS. A stochastic model of cytotoxic T cell responses. *J Theor Biol*. 2004 May 21;228(2):227–240.
17. **Chao DL**, Davenport MP, Forrest S, Perelson AS. Modelling the impact of antigen kinetics on T-cell activation and response. *Immunol Cell Biol*. 2004 Feb;82(1):55–61.
18. **Chao DL**, Forrest S. Information Immune Systems. *Genetic Programming and Evolvable Machines*. 2003;4(4):311–331.
19. Wagner D, Brown MJF, Broun P, Cuevas W, Moses LE, **Chao DL**, Gordon DM. Task-related differences in the cuticular hydrocarbon composition of the harvester ant, *Pogonomyrmex barbatus*. *Journal of Chemical Ecology*. 1998;24(12):2021–2037.

NON-REFEREED PUBLICATIONS

1. Galipeau PC, **Chao DL**, Li X, Arnaudo JD, Kissel HD, Sanchez CA, Reid BJ. Barrett's esophagus and esophageal adenocarcinoma epigenetic biomarker discovery using Infinium methylation. San Diego, CA: Illumina, Inc.; 2008.
2. **Chao DL**. Computer games as interfaces. *interactions*. 2004;11(5):71–2.
3. **Chao DL**, Levin SA. Herding behavior: The emergence of large-scale phenomena from local interactions. In: Ruan S, Wolkowicz GSK, Wu J, editors. *Differential Equations with Applications to Biology*. vol. 21 of Fields Institute Communications. Providence, Rhode Island: American Mathematical Society; 1999. p. 81–95.

PATENTS

1. **Chao DL**. Color-patch sheet registration. U.S. Patent 6,404,517. Issued June 11, 2002.
2. Li C, Pascovici A, Shu J, **Chao DL**. On-line ink-duty reduction. U.S. Patent 5,799,136. Issued August 25, 1998.

CONFERENCE PROCEEDINGS

1. **Chao DL**, Balthrop J, Forrest S. Adaptive Radio: Achieving consensus using negative preferences. In K. Schmidt, M. Pendergast, M. Ackerman, and G. Mark, editors, *Group '05: Proceedings of the 2005 International ACM SIGGROUP Conference on Supporting Group Work*. pp 120-3. ACM Press, New York, 2005.

2. **Chao DL**, Davenport MP, Forrest S, Perelson AS. Stochastic stage-structured modeling of the adaptive immune system. *Proceedings of the IEEE Computer Society Bioinformatics Conference (CSB 2003)*, pp 124-131. IEEE Press, Los Alamitos, California, 2003.
3. **Chao DL**, Forrest S. Generating biomorphs with an aesthetic immune system. In R. Standish, M. A. Bedau, and H. A. Abbass, editors, *Artificial Life VIII: Proceedings of the Eighth International Conference on the Simulation and Synthesis of Living Systems*, pages 89-92. MIT Press, Cambridge, Massachusetts, 2003.
4. **Chao DL**, Forrest S. Information immune systems. In J. Timmis and P. J. Bentley, editors, *Proceedings of the First International Conference on Artificial Immune Systems*, pages 132-40. University of Kent at Canterbury Printing Unit, Canterbury, England, 2002.
5. **Chao DL**. Doom as an interface for process management. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI Letters 3, 1)*, pages 152-7. ACM Press, New York, 2001.

INVITED PRESENTATIONS

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| 1/2012 | Modeling the global circulation of influenza.
Presented at <i>Facing the Challenge of Infectious Diseases</i> . Aosta, Italy. |
| 11/2011 | Modelling of antiviral use and resistance emergence – implications for use.
Presented at <i>Influenza Antivirals: Efficacy and Resistance</i> . Rio de Janeiro, Brazil. |
| 5/2010 | Modeling the spread of pandemic H1N1 in the United States: 2009 and beyond.
Presented at <i>International Conference on Computational Science 2010</i> . Amsterdam, Netherlands. |
| 11/2007 | Barrett's Oesophagus.
Presented at <i>Infección, Inflamación y Cáncer</i> . Instituto de Investigaciones en Salud, Universidad de Costa Rica. San Jose, Costa Rica. |

CURRENT AND RECENTLY COMPLETED GRANT SUPPORT

- Containing Bioterrorist and Emerging Infectious Diseases* \$893,467
 NIH/NIGMS 5U01 GM070749 (PI: Longini/Halloran) 5/1/2004–4/30/2014
 The major goal of this project is to develop mathematical and statistical models for the control of bioterrorist and emerging infectious disease threats. The specific aims are to 1) Develop epidemic mathematical models for the transmission of naturally occurring infectious diseases and bioterrorism agents and 2) To develop models at the with-in host level which allows us to link the dynamics of infection of individual hosts with the transmission of the pathogen in the host population.
- Development and Testing of Dengue Vaccines* \$230,000
 Bill and Melinda Gates Foundation (Subaward PI: Longini) 3/18/2011–5/18/2012
 We are developing statistical and simulation approaches to analyzing dengue vaccine trial data and to provide guidance for vaccine roll-out.
- Emergency preparedness and response program for Los Angeles County, CA* \$43,844
 PHFE Management Solutions H-702550 (PI: Chao) 7/1/2011-7/31/2011
 We developed a computer simulation model of the transmission of various infectious agents, including smallpox, pneumonic plague, and SARS. We will use these models to help Los Angeles County prepare for outbreaks, including bioterrorist attacks.
- Containing Bioterrorist and Emerging Infectious Diseases (supplement)* \$100,001
 NIH/NIGMS 3U01 GM070749-08S3 (PI: Longini/Halloran) 5/1/10–4/30/11
 This supplement supported our efforts in studying cholera using statistical and modeling approaches.