

CONTACT INFORMATION

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RESEARCH INTERESTS

Modeling and analysis of systems that impact public health, particularly cancer biomarker discovery, the immune response to infection, and vaccination strategies to reduce the spread of epidemics.

EDUCATION

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

RECENT EMPLOYMENT

Staff scientist, July 2008–present
Fred Hutchinson Cancer Research Center • Seattle, WA
Postdoctoral fellow, 2004–June 2008
Fred Hutchinson Cancer Research Center • Seattle, WA
Research assistant, 1999–2004
Department of Computer Science of the University of New Mexico • Albuquerque, NM
Teaching assistant, 1998–1999
Department of Computer Science of the University of New Mexico • Albuquerque, NM
Technical staff, 1994–1998
EPSON Palo Alto Laboratory • Palo Alto, CA

PROFESSIONAL ACTIVITIES

Instructor, Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington, 2009–2010.
Symposium organizer, Biological networks: from measurements to modeling, FHCRC, 2007.
Planning committee, FHCRC Bioethics Colloquium, 2006–2007.
Co-manager, FHCRC Interdisciplinary Club, 2005–2007.
The Pathobiology of Cancer: The Edward A. Smuckler Memorial Workshop, July 2005.
Santa Fe Institute Complex Systems Summer School, June 2000.
Founder, UNM Computer Science Graduate Student Association, 1999.

HONORS AND AWARDS

- Student/Postdoc Advisory Committee course scholarship, FHCRC, 2005.
Dual Mentor Fellow, FHCRC, 2004–2006.
Research, Project, and Travel grant, UNM Office of Graduate Studies, 2002.
Student Research Allocations Committee grant, UNM Graduate and Professional Student Association, 2002.
Outstanding graduate student award, UNM Computer Science Department, 2002.
Passed Ph.D. comprehensive examination with distinction, UNM Computer Science Department, 2002.
Graduate Fellow, NSF BIO Research Training Group in Ecological Complexity, UNM, 1999-2001.
Membership in the Society of Sigma Xi, 1993.

JOURNAL PUBLICATIONS

- Wang P, **Chao DL**, and Hsu L. Learning oncogenic pathways from binary genomic instability data, *Biometrics*; In press.
- Chao DL**, Halloran ME, Longini IM Jr. School opening dates predict pandemic influenza A (H1N1) epidemics in the United States. *J Infect Dis.* 2010 Sep 15;202(6):877–80.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Davenport MP, Ribeiro RM, **Chao DL**, Perelson AS. Predicting the impact of a nonsterilizing vaccine against human immunodeficiency virus. *J Virol.* 2004 Oct;78(20):11340–51. PMID: PMC521856.
- 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.
- 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.
- Chao DL**, Forrest S. Information Immune Systems. *Genetic Programming and Evolvable Machines.* 2003;4(4):311–331.
- 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.

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.

REFEREED CONFERENCE PUBLICATIONS

Ribeiro RM, Perelson AS, **Chao DL**, Davenport MP. HIV epidemiology and the impact of nonsterilizing vaccines. In: Mondaini RP, ao RD, editors. *Proceedings of BIOMAT 2006: International Symposium on Mathematical and Computational Biology*. Singapore: World Scientific Publishing; 2007. p. 69–88.

Chao DL, Balthrop J, Forrest S. Adaptive Radio: Achieving consensus using negative preferences. In: Schmidt K, Pendergast M, Ackerman M, Mark G, editors. *GROUP '05: Proceedings of the 2005 International ACM SIGGROUP Conference on Supporting Group Work*. New York: ACM Press; 2005. p. 120–123.

Chao DL, Davenport MP, Forrest S, Perelson AS. Stochastic stage-structured modeling of the adaptive immune system. In: *Proceedings of the IEEE Computer Society Bioinformatics Conference (CSB 2003)*. Los Alamitos, California: IEEE Press; 2003. p. 124–131.

Chao DL, Forrest S. Generating Biomorphs with an aesthetic immune system. In: Standish R, Bedau MA, Abbass HA, editors. *Artificial Life VIII: Proceedings of the Eighth International Conference on the Simulation and Synthesis of Living Systems*. Cambridge, Massachusetts: MIT Press; 2003. p. 89–92.

Chao DL, Forrest S. Information immune systems. In: Timmis J, Bentley PJ, editors. *Proceedings of the First International Conference on Artificial Immune Systems*. Canterbury, England: University of Kent at Canterbury Printing Unit; 2002. p. 132–140.

Chao DL. Doom as an interface for process management. In: Jacko JA, Sears A, Beaudouin-Lafon M, Jacob RJK, editors. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. New York: ACM Press; 2001. p. 152–157.

Pascovici A, Li C, Shu J, **Chao DL**. Ink reduction for cluster dot halftoning. In: *Proceedings of the 1997 IS&T/SPIE International Symposium on Electronic Imaging Science and Technology*. vol. 3018; 1997. p. 293–299.

OTHER PUBLICATIONS

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.

Chao DL. Computer games as interfaces. *interactions*. 2004;11(5):71–2.

JOURNAL MANUSCRIPTS UNDER REVIEW

Chao DL, Matrajt L, Basta NE, Sugimoto JD, Dean B, Bagwell DA, Ojulstad B, Halloran ME, and Longini IM Jr. Planning control of pandemic influenza H1N1 in Los Angeles County and the United States.

Chao DL, Halloran ME, and Longini IM Jr. School opening dates predict pandemic influenza A (H1N1) epidemics in the USA.

PATENTS

Chao DL. Color-patch sheet registration. U.S. Patent 6,404,517. Issued June 11, 2002.

Li C, Pascovici A, Shu J, and **Chao DL**. On-line ink-duty reduction. U.S. Patent 5,799,136. Issued August 25, 1998.

CURRENT FUNDING

Containing Bioterrorist and Emerging Infectious Diseases

NIH/NIGMS 5U01 GM070749 (PI: Longini) • 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.

Pandemic Influenza Micro-Simulation Model for Pandemic Preparedness Planning for Los Angeles County, CA

PHFE Management Solutions PHFE-H702550-2 (PI: Longini) • 3/17/2008–8/9/2009

The major goal of this project is to build a large-scale parallelized computer pandemic influenza simulator specially customized for Los Angeles (LA) County to investigate different intervention strategies and to provide suggestions for effective pandemic influenza preparedness.