

**CURRICULUM VITAE**

**Name:** Jonathan H. Chen, MD, PhD  
**Position:** Instructor  
Stanford Department of Medicine

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**EDUCATION:**

1994-1996	California State University of Los Angeles		
1996-2000	University of California – Los Angeles	B.S.	Summa Cum Laude,
	Cybernetics with Specialization in Computer Studies		
2002-2011	University of California - Irvine	M.D. (Medical Scientist Training Program)	
2002-2009	University of California - Irvine	Ph.D.	Computer Science
	School of Information & Computer Science		
2011-2012	Stanford University Hospital	Intern	Internal Medicine
2012-2013	Stanford University Hospital	Resident	Internal Medicine
2014-2015	Veteran Affairs Palo Alto, Stanford	Fellow	Medical Informatics

**LICENSES, CERTIFICATION:**

2012	Medical Licensure, California, A122045
2014	Internal Medicine Board Certification
2016	Clinical Informatics Board Certification

**PRINCIPAL POSITIONS HELD:**

1999-00	<i>20th Century Fox, Information Tech</i> , Software Developer "Atlas" Home Entertainment International Sales Forecasting	
2000-01	<i>Trilogy Software</i> , Software Engineer / Quality Engineer	
2001-02	<i>20th Century Fox, Information Tech</i> . Software Developer Accounts Receivable, Contract Maintenance Application	
2010-now	<i>Reaction Explorer LLC</i> , Founding Member	
2014-15	Stanford, Veterans Affairs Palo Alto	Fellow
2015-now	Stanford Department of Medicine Division of General Medicine Disciplines Hospitalist Division ClickWell Care, Primary Care and Telehealth Clinic	Instructor

**HONORS AND AWARDS:**

1994 CSULA Early Entrance Program (*Began full-time college at age 13*)

- 1994 CSULA Honor's Student of the Year, Nominated
- 1994 CSULA Dean's List
- 1995 CSULA Dean's List
- 1997 UCLA Dean's List
- 2000 UCLA BS Cybernetics with Specialization in Computer Studies  
Summa Cum Laude with College Honors and Departmental Honors
- 2003 UCI Basic Sciences Certificate of Excellence
- 2005 UCI Educational Affairs Service Award
- 2007 UCI MSTP Research Presentation Award (*Awarded for best student presentation of the MSTP*)
- 2008 UCI MSTP Research Presentation Award
- 2008 CINF (Chemical Informatics) Scholarship for Scientific Excellence
- 2009 CINF (Chemical Informatics) Scholarship for Scientific Excellence
- 2010 Alpha Omega Alpha Honor Medical Society (Junior Inductee)
- 2011 UCI MD/PhD, Graduated with Distinctions in Research and Service
- 2014 AMIA Joint Summits on Translational Science, Best Student Paper
- 2015 AMIA Joint Summits on Translational Science, Best Student Paper, Finalist
- 2015 ACP Northern California Research Competition, First Place
- 2016 SGIM California-Hawaii Research Competition, Second Place

**KEYWORDS/AREAS OF INTEREST:**

Electronic Health Records, Data-Mining, Crowdsourcing, Recommender Systems, Collaborative Filtering, Observational Research, Implementation Science, Prescription Opioids, Medical Decision Making, Machine Learning, Secondary Analysis, Clinical Decision Support

**PROFESSIONAL ACTIVITIES**

CLINICAL

SUMMARY OF CLINICAL ACTIVITIES

Since completing Internal Medicine residency training in 2014, I continued clinical work during my research fellowship through part-time shift work through the Palo Alto Medical Foundation's inpatient nocturnist service covering general medical patients and admissions as well as Stanford's newly formed Express Care clinic to accommodate increasing demands for same-day outpatient general medical care. As I transitioned from fellowship to an instructor role, I now continue 10% time in Stanford's new ClickWell clinic, an opportunity to work in an innovative care setting that incorporates telehealth and phone visits into primary care to better understand the full range of health system services, as well as 10% time attending on the inpatient general medicine teaching service to afford regular education opportunities for housestaff and medical students in an acute care setting.

**PROFESSIONAL ORGANIZATIONS**

Memberships:

- AMIA (American Medical Informatics Association)
- ACP (American College of Physicians)
- SGIM (Society for General Internal Medicine)
- AOA (Alpha Omega Alpha)
- ACS (American Chemical Society) (previous 2007-2011)

## SERVICE TO PROFESSIONAL PUBLICATIONS:

### Peer Reviewer:

- AMIA Annual Symposium
- AMIA Joint Summits on Translational Science
- Bioinformatics
- British Medical Journal
- Computers in Biology and Medicine
- Health Affairs
- JAMA Internal Medicine
- Journal of Biomedical Informatics
- Journal of Chemical Information and Modeling
- Machine Learning in Healthcare Symposium
- Medicine
- Pacific Symposium of Biocomputing
- PLoS One

## INVITED PRESENTATIONS

### NATIONAL

- 2006 *Chemical Informatics: Database Searching, Similarity Measures and Property Prediction*  
**NIH/National Library of Medicine Training Conference**
- 2007 *ChemDB: A public database of small molecules and related chemoinformatics resources*  
**American Chemical Society (ACS) National Meeting, Chicago, IL Spring**
- 2007 *Synthesis Explorer: Dynamically generated reaction and synthesis problems for organic chemistry education*  
**American Chemical Society (ACS) National Meeting, Chicago, IL Spring**
- 2008 *Synthesis Explorer: Organic chemistry tutorial system for multistep synthesis design and reaction mechanism prediction*  
**American Chemical Society (ACS) National Meeting, New Orleans, LA, Spring**
- 2008 *Reaction prediction, classification, and retro-synthesis using a rule-based reaction expert system*  
**American Chemical Society (ACS) National Meeting, New Orleans, LA, Spring**
- 2008 *Organic Reaction Expert Systems*  
**NIH/National Library of Medicine Training Conference**
- 2008 *Reaction mechanism prediction by transformation rules and general principles*  
**American Chemical Society (ACS) National Meeting, Philadelphia, PA, Fall**
- 2009 *Artificial Intelligence in Chemistry: An Expert Computer System for Predicting Organic Chemistry Reactions*  
**NIH/National Library of Medicine Board of Regents Meeting**
- 2009 *Synthesis Explorer: Organic chemistry tutorial system for multistep synthesis and mechanism problems with personalized assessment and adaptive problem generation*  
**American Chemical Society (ACS) National Meeting, Salt Lake City, UT, Spring**
- 2009 *Reaction simulation expert system for synthetic organic chemistry*  
**American Chemical Society (ACS) National Meeting, Salt Lake City, UT, Spring**
- 2011 *Reaction Explorer: Organic chemistry online tutorial system for multistep synthesis and mechanism problems adapted to engage students through gaming interfaces*  
**American Chemical Society (ACS) National Meeting, Anaheim, CA, Spring**

- 2013 *Mining for Clinical Expertise in (Undocumented) Electronic Order Sets*  
**AMIA Joint Summits on Translational Science, San Francisco, CA**
- 2014 *Automated Physician Order Recommendations and Outcome Predictions by Data-Mining Electronic Medical Records*  
**AMIA Joint Summits on Translational Science, San Francisco, CA**
- 2015 *Data-Mining Electronic Medical Records for Clinical Order Recommendations, Wisdom of the Crowd or Tyranny of the Mob?*  
**AMIA Joint Summits on Translational Science, San Francisco, CA**
- 2015 *OrderRex: Data-Mining Clinical Decision Support from Electronic Medical Records, Wisdom of the Crowd or Tyranny of the Mob?*  
**Stanford Medicine X, NIH/National Library of Medicine Training Conference**
- 2016 *Decaying Relevance of Clinical Data when Predicting Future Decisions*  
**Pacific Symposium of Biocomputing**
- 2016 *Automated Organization of Electronic Health Record Data by Probabilistic Topic Modeling to Inform Clinical Decision Making*  
**AMIA Joint Summits on Translational Science, San Francisco, CA**
- 2016 *Opioid Prescribing Distribution: What if it's not just a few bad apples?*  
**NIH/NIDA Clinical Trials Network (Webinar)**
- 2016 *Usability of an Automated Recommender System for Clinical Order Entry*  
**AMIA Annual Symposium**
- 2016 *Decaying Relevance of Clinical Data when Predicting Future Decisions*  
**NIH Big Data 2 Knowledge (BD2K) All Hands Meeting**
- 2017 *Decaying Relevance of Clinical Data when Predicting Future Decisions*  
**AMIA Joint Summits on Translational Science**
- 2017 *The Physician Data Scientist an Unexpected Journey*  
**Pacific Symposium of Biocomputing**
- 2017 *Deep Cohort Studies: From Google Baseline to the Precision Medicine Initiative to VA's Million Veterans*  
**NIH/NIDA Clinical Trials Network (Webinar)**

#### REGIONAL AND OTHER INVITED PRESENTATIONS

- 2012 *Physician Order Suggestions by Clinical Expertise Mined from (Undocumented) Order Sets*  
**University of California, Irvine, Institute for Genomics and Bioinformatics**
- 2015 *Data-Mining Electronic Health Records for Clinical Decision Support*  
**Veteran Affairs Palo Alto, Center for Innovation to Implementation**
- 2015 *Data-Mining Electronic Health Records for Clinical Decision Support*  
**Stanford Primary Care and Outcomes Research (PCOR)**
- 2015 *Data-Mining Electronic Health Records for Clinical Decision Support*  
**Chapman University**
- 2016 *Data-Mining Electronic Health Records for Clinical Decision Support*  
**Stanford Department of Medicine Grand Rounds**
- 2016 *Data-Mining Electronic Health Records for Clinical Decision Support*  
**Kaiser Permanente Division of Research**
- 2016 *Data-Mining Electronic Health Records for Clinical Decision Support*  
**OCHIN Research**
- 2016 *Data-Mining Electronic Health Records for Clinical Decision Support*

**Stanford Mobilize Center**

2016 *Wisdom of the Crowd or Tyranny of the Mob? Data-Mining Electronic Health Records for Clinical Decision Support*

**Stanford Biomedical Informatics Research**

2016 *Wisdom of the Crowd or Tyranny of the Mob? Data-Mining Electronic Health Records for Clinical Decision Support*

**Columbia University Department of Biomedical Informatics**

2016 *Wisdom of the Crowd or Tyranny of the Mob? Data-Mining Electronic Health Records for Clinical Decision Support*

**University of Pittsburgh Department of Biomedical Informatics**

2016 *Wisdom of the Crowd or Tyranny of the Mob? Data-Mining Electronic Health Records for Clinical Decision Support*

**University of California San Francisco Department of Medicine**

2017 *Wisdom of the Crowd or Tyranny of the Mob? Data-Mining Electronic Health Records for Clinical Decision Support*

**University of Washington Department of Biomedical Informatics and Medical Education**

2017 *Wisdom of the Crowd or Tyranny of the Mob? Data-Mining Electronic Health Records for Clinical Decision Support*

**Washington University of St. Louis Institute for Informatics**

**GOVERNMENT and OTHER PROFESSIONAL SERVICE: N/A**

**UNIVERSITY AND PUBLIC SERVICE**

**UNIVERSITY SERVICE: N/A**

**PUBLIC SERVICE: N/A**

**TEACHING and TRAINING****SEMINARS**

2015 Residents Caught in the Middle, Stanford / VA Internal Medicine Noon Conference

2017 Understanding Health Care Reform, Stanford / VA Internal Medicine Noon Conference

**PREDOCTORAL STUDENTS SUPERVISED OR TRAINED:**

Dates	Name	Program or School	Role	Current Position
2015-2016	Gustavo Chavez	Stanford Medical School	Research Supervision	MS2
2016	Muthu Alagappan	Stanford Medical School	Research Supervision	Internal Medicine PGY1
2017	Jason Wang	Stanford Computer Science	Research Supervision	Undergraduate
2017	Shivaal Roy	Stanford Computer Science	Research Supervision	Undergraduate
2017	Angelica Perez	Stanford Computer Science	Technical Supervision	RA

**POSTDOCTORAL FELLOWS AND RESIDENTS DIRECTLY SUPERVISED OR TRAINED:**

Dates	Name	Fellow	Faculty Role	Current Position
2016	Albee Ling, PhD	Graduate Student	Research Feedback	Graduate Student
2015	Anne Smeraglio, MD	PGY-3 Resident	Research Supervision	Hospitalist, OHSU
2015	Zoe Quandt, MD	PGY-3 Resident	Research Supervision	Fellow, Endocrine
2015-2016	Ron Li, MD	PGY-2,3 Resident	Research Supervision	PGY3 → Stanford Clin Info
2015	Daniel Fang, MD	PGY-3 Resident	Research Supervision	Hospitalist, VA
2014-2016	David Ouyang, MD	PGY-1,2 Resident	Research Supervision	PGY3 → Stanford Cardiology

**TEACHING NARRATIVE**

I taught complex problem solving in my graduate work and engineered such knowledge into a computer expert system that can dynamically generate, solve, and explain problems in an applied domain (organic chemistry). Besides research applications in drug discovery, I translated this abstract research concept into a practical teaching tool in the hands of real people when I co-founded a startup company (Reaction Explorer) that continues to distribute the system to thousands of students around the world.

I was nominated by my peers for the Internal Medicine Residency Teaching Award for efforts ranging from role-modeling delicate end-of-life counseling to giving educational “chalk talks” to authoring templates for medical decision making in common diseases. I shared these templates as a reusable artifact of applied learning via the hospital electronic medical record where they have been used by dozens of trainees (most of whom I’ve never directly worked with). Similarly, I produced a collection of web-based calculators, including an arterial blood gas interpreter that has since been integrated by MDCalc.com and Epic’s default system templates. I have found it more effective and mutually satisfying to approach clinical and research teaching by example, framing questions as problems to be solved together with learners in the face of real-world situations.

**TRAINING NARRATIVE**

I have directly trained medical students, a graduate student, and resident physicians. This has yielded trainee presentations in the Stanford Leaders in Health Disparities Summer research program, SGIM and ACP 2015 regional meetings, as well as publications in the American Journal of Medicine, Journal of Hospital Medicine, and JAMA Internal Medicine. As a simple guiding principle, I approach training as being invested in the success of the trainee, whatever they define success to be. Doing so then naturally directs the relationship towards skill building, networking, or applied work that will be the most productive.

**TEACHING AIDS:***Reaction Explorer*

I created a novel online teaching system that allows for inquiry-based learning with “unlimited replay value” by algorithmically generating complex organic chemistry problems on-demand. I provided direct teaching assistance supporting deployment of the initial prototype in undergraduate classes (2008-2009)

**TEACHING AWARDS AND NOMINATIONS:**

2012 Stanford Internal Medicine Residency, Resident Teaching Award Nominee

**RESEARCH AND CREATIVE ACTIVITIES****RESEARCH AWARDS AND GRANTS****CURRENT**

1. K01 K01ES026837 (PI)	2015-2020
NIH/NIEHS \$178,606/yr	
Mentored Career Development Award in Biomedical Data Science	

**PAST**

Stanford Health Care Innovation Challenge Seed Grant	2015-2016
Stanford Translational Research and Applied Medicine (TRAM) Grant	2012-2015
Orange County ARCS Foundation Scholarship	2005-2007
NIH/NLM Biomedical Informatics Training (UC Irvine)	2006-2009

NIH Medical Scientist Training Program (UC Irvine)

2002-2011

**PEER REVIEWED PUBLICATIONS:**

1. Danziger SA, Swamidass SJ, Zeng J, et al. Functional census of mutation sequence spaces: the example of p53 cancer rescue mutants. *IEEE/ACM Trans. Comput. Biol. Bioinform.* 2006;3(2):114-25
2. Swamidass SJ, **Chen J**, Bruand J, Phung P, Ralaivola L, Baldi P. Kernels for small molecules and the prediction of mutagenicity, toxicity and anti-cancer activity. *Bioinformatics* 2005;21 Suppl 1(2):i359-68
3. **Chen J**, Swamidass SJ, Dou Y, Bruand J, Baldi P. ChemDB: A public database of small molecules and related cheminformatics resources. *Bioinformatics* 2005;21(22):4133-4139
4. Azencott C-A, Ksikes A, Swamidass SJ, **Chen JH**, Ralaivola L, Baldi P. One- to four-dimensional kernels for virtual screening and the prediction of physical, chemical, and biological properties. *J. Chem. Inf. Model.* 2007;47(3):965-74
5. **Chen JH**, Linstead E, Swamidass SJ, Wang D, Baldi P. Chem DB update — full-text search and virtual chemical space. *Bioinformatics* 2007;23(17):2348-51
6. **Chen JH**, Baldi P. Synthesis Explorer: A Chemical Reaction Tutorial System for Organic Synthesis Design and Mechanism Prediction. *J. Chem. Educ.* 2008;85(12):1699
7. **Chen JH**, Baldi P. No electron left behind: a rule-based expert system to predict chemical reactions and reaction mechanisms. *J. Chem. Inf. Model.* 2009;49(9):2034-43
8. **Chen JH**, Kayala MA, Baldi P. Reaction Explorer: Towards a Knowledge Map of Organic Chemistry To Support Dynamic Assessment and Personalized Instruction. In: *Enhancing Learning with Online Resources, Social Networking, and Digital Libraries*. Vol 1060. ACS Symposium Series. American Chemical Society; 2010:11-191
9. Kayala MA, Azencott C-A, **Chen JH**, Baldi P. Learning to predict chemical reactions. *J. Chem. Inf. Model.* 2011;51(9):2209-22

## Post-Graduate Publications:

10. **Chen JH**, Altman RB. Mining for clinical expertise in (undocumented) order sets to power an order suggestion system. *AMIA Jt. Summits Transl. Sci. Proc. AMIA Summit Transl. Sci.* 2013;2013:34-8
11. **Chen JH**, Altman RB. Automated physician order recommendations and outcome predictions by data-mining electronic medical records. *AMIA Jt. Summits Transl. Sci. Proc. AMIA Summit Transl. Sci.* 2014;2014:206-10.
12. **Chen JH**, Fang DZ, Tim Goodnough L, Evans KH, Lee Porter M, Shieh L. Why providers transfuse blood products outside recommended guidelines in spite of integrated electronic best practice alerts. *J. Hosp. Med.* 2015;10(1):1-7
13. Garg T, Lee JY, Evans KH, **Chen J**, Shieh L, Safety P. Development and Evaluation of an Electronic Medical Record-Based Best-Practice Discharge Checklist for Hospital Patients. *Jt. Comm. J. Qual. Patient Saf.* 2015;41(3):126.
  - Developed original content (discharge checklist) that was the subject of study as well as recruitment of research participants (disseminating content and educating user colleagues).
14. **Chen JH**, Altman RB. Data-Mining Electronic Medical Records for Clinical Order Recommendations: Wisdom of the Crowd or Tyranny of the Mob? *AMIA Jt. Summits Transl. Sci. Proc. AMIA Summit Transl. Sci.* 2015;2015:435-9
15. Shieh L, Go M, Gessner D, **Chen JH**, Hopkins J, Maggio P. Improving and sustaining a reduction in iatrogenic pneumothorax through a multi-faceted quality-improvement approach. *J. Hosp. Med.* 2015;10(9):599-607

- Provided additional data and analytics support on querying clinical databases to quantitatively respond to peer-reviewer questions.
16. **Chen JH**, Podchiyska T, Altman RB. OrderRex: clinical order decision support and outcome predictions by data-mining electronic medical records. *J. Am. Med. Informatics Assoc.* 2015;23(2):339-348
17. Ouyang D, **Chen JH**, Hom J, Chi J. Internal Medicine Resident Computer Usage: An Electronic Audit of an Inpatient Service. *JAMA Intern. Med.* 2016;176(2):252-4
- Setup data acquisition and management strategy. Participated in project design and conception. Supervised trainee (Ouyang) on analysis, drafting, and peer review process.
18. **Chen JH**, Humphreys K, Shah NM, Lembke A. Distribution of Opioids by Different Types of Medicare Prescribers. *JAMA Intern. Med.* 2016;176(2):259-61
19. **Chen JH**, Goldstein MK, Asch SM, Mackey L, Altman RB. Dynamically Evolving Clinical Practices and Implications for Predicting Medical Decisions. In: *Pacific Symposium of Biocomputing*. Vol 21.; 2016.
20. **Chen JH**. The Patient You Least Want to See [A Piece of My Mind]. *JAMA* 2016;315(16):1701
21. Ouyang D, **Chen JH**, Krishnan G, Hom J, Witteles R, Chi J. Patient Outcomes When Housestaff Exceed Eighty Hours per Week. *Am. J. Med.* 2016
- Setup data acquisition and management strategy. Participated in project design and conception. Supervised trainee (Ouyang) on analysis (including direct review of analysis code), drafting, and peer review process.
22. Hom, J., Richman, I., **Chen, J.H.**, Singh, B., Crump, C., Chi, J. Fulfilling Outpatient Medicine Responsibilities During Internal Medicine Residency: A Quantitative Study of Housestaff Participation with Between Visist Tasks, *BMC Med. Educ.* 2016; 16(1):139
- Support for data acquisition, management, and analytics as well as internal peer review and feedback of manuscript.
23. Lembke, A., **Chen, J.H.**, Use of Opioid Agonist Therapy for Medicare Patients in 2013, *JAMA Psychiatry* (2016)
- Actively participated in project conception and design. Performed analysis and figure creation. Actively supported peer review process with additional literature review and analysis to address reviewer comments.
24. **Chen, J.H.**, Goldstein, M.K., Asch, S.M., Mackey, L., Altman, R.B., Predicting Inpatient Clinical Order Patterns with Probabilistic Topic Models vs. Conventional Order Sets, *Journal of the American Medical Informatics Association* (2016)
25. **Chen, J.H.**, Hom, J., Richman, I., Asch, S.M., Podchiyska, T., Atwan Johansen, N., Effect of Opioid Prescribing Guidelines in Primary Care, *Medicine* (2016)
26. Garmire, L.X., Gliske, S., Nguyen, Q.C., **Chen, J.H.**, Nemati, S., Van Horn, J.D., Moore, J.H., Shreffler, C., Dunn, M. The training of next generation data scientists in biomedicine. *Pacific Symposium of Biocomputing* (2017)
- Drafted section on Clinical Informatics training
27. **Chen, J.H.**, Alagappan, M., Goldstein, M.K., Asch, S.M., Altman, R.B., Decaying Relevance of Clinical Data Towards Future Decisions in Data-Driven Inpatient Clinical Order Sets, *International Journal of Medical Informatics* (2017)
28. **Chen, J.H.**, Asch, S.M., Machine Learning and Prediction in Medicine – Beyond the Peak of Inflated Expectations, *New England Journal of Medicine* (2017) (Accepted)

Submitted Manuscripts:



29. Chavez. G., Richman, I.B., Yasukawa, L.A., Altman, R.B., Periyakoil, V.S., **Chen, J.H.**, Reversals and Limitations on High-intensity, Life-Sustaining Treatments (2017) (Submitted)
30. Wang JK, Schuler A, Baiocchi M, Shah NH, **Chen JH**, Impact of Clinician Experience on Machine Learned Clinical Order Patterns (2017) (Submitted)
31. Roy S, Hom J, Mackey L, Shah NH, **Chen JH**, Predicting Low Information Laboratory Diagnostic Tests (2017) (Submitted)

## **NON-PEER REVIEWED PUBLICATIONS AND OTHER CREATIVE ACTIVITIES:**

### **Review Articles (N/A)**

### **Books and Chapters**

1. Le, E., Iyer, S., Patil, T., Li, R., **Chen, J. H.**, Wang, M., & Sobel, E. (2017). The Impact of Big Data on the Physician. In S. Srinivasan (Ed.), Guide to Big Data Applications. New York: Springer.
  - Supervised trainee co-author (Ron Li) on conception and drafting of content for his section on different approaches to electronic clinical decision support and myself drafted section on data-driven collaborative filtering approaches.

### **Other Publications**

2. Leung, T., **Chen, J.H.**, Clinical Informatics: Journeys into an Emerging Subspecialty, Society of General Internal Medicine Forum (2017) (Accepted)
  - Actively engaged in manuscript conception and design and drafted half of content.

## **PATENTS ISSUED OR PENDING (ALLOWED): N/A**

## **OTHER CREATIVE ACTIVITIES**

### Reaction Explorer LLC (2010-Present)

- Founding partner of startup company based on a unique system for teaching complex problem-solving in organic chemistry with the aid of expert system technology.
- Original inventor of the technology from graduate research project.
- Carried the concept through from original invention to formation of the company and translation of the technology into a profitable commercial application.
- In partnership with John Wiley & Sons, Inc., global leader in higher education publishing, the application is now being distributed to schools and students across the nation and the world so that they may benefit from its unique learning advantages.

### Stanford Resident Informatics Council (2012-2014)

- Resident representative to develop and support efficient training and usage of hospital electronic medical record systems by the housestaff
- Developed multiple documentation templates for efficiency as well as teaching of common medicine problems, widely used by the housestaff
- Revived as principal editor of [Wiki] knowledge sharing site to persist and distribute housestaff survival strategies

### Medical Elective Scheduling System (2005-2010)

- Self-initiated design and development of a Web-accessible 3rd & 4th year medical student rotation scheduling system.
- Directly addressed years of student complaints of manual system requiring scheduled administrator meeting for every action.

### Medical Calculation / Analysis Tools (2009-Present)

- Web-based scripts / pages for calculation and analysis of common issues on medicine wards.
- Function as simple web pages, meaning they are usable from any web-browser or smartphone.
- Acid-Base Analyzer adopted by MDCalc.com and licensed for in Epic's standard templates
- Interactive Local Antibiogram continues to be used by Stanford housestaff years later, appearing as the first Google result for "Stanford Antibiogram" (above even the official resource)

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