

Hye-Chung Kum

Associate Professor
Department of Health Policy and Management, School of Public Health
Texas A&M Health Science Center, Texas A&M University
Email: kum@tamu.edu Telephone: 979-436-9439
Website: <http://pinformatics.org/>

EDUCATION

[Dr. Kum is a first generation data scientist cross-trained both in computer science and policy & management.]

B.S.	Yonsei University, Seoul, Korea	Computer Science	1991-1995
M.S.	University of North Carolina at Chapel Hill, NC	Computer Science	1995-1997
M.S.W.	University of North Carolina at Chapel Hill, NC	Social Work	1997-1998
	Macro (Policy & Management) Concentration Certificate in Nonprofit Leadership and Management		
Ph.D.	University of North Carolina at Chapel Hill, NC	Computer Science	1995-2004
	Advisor: Wei Wang (Computer Science) & Dean F. Duncan (Social Work) Thesis: Approximate Mining of Consensus Sequential Patterns Available on Google books. Royalty received for 8 copies sold. Honors: The Paul Hardin Dissertation Fellowship – Royster Fellows (2004) The UNC-CH Graduate School's Dean's Award (2003)		

LANGUAGE English and Korean (Bilingual)

EMPLOYMENT

Texas A&M University, College Station, TX (Supervisor: Michael Morrissey)

August 2013 – current: Associate Professor, Department of Health Policy and Management,
Health Science Center, School of Public Health

Sep 2015 – current: Joint Associate Professor, Department of Industrial and Systems
Engineering, College of Engineering

Sep 2015 – current: Joint Associate Professor, Department of Computer Science and
Engineering, College of Engineering

June 2015 – current: Member, Center for Remote Health Technologies & Systems (CRHTS)
Texas A&M Engineering Experiment Station (TEES)

Aug 2013 – current: Lead, Population Informatics Research Group
Department of Health Policy and Management

The University of North Carolina at Chapel Hill, NC (Supervisor: Dean Duncan)

July 2012 – Aug 2016: Adjunct Associate Professor, Department of Computer Science

July 2004 – June 2012: Adjunct Assistant Professor, Department of Computer Science

July 2012 – 2013: Research Associate Professor, School of Social Work

July 2004 – June 2012: Research Assistant Professor, School of Social Work

Aug 2010 – current: Founder & co-Lead, Population Informatics Research Group
Department of Computer Science

PUBLICATIONS

<https://scholar.google.com/citations?user=Q1QxnqoAAAAJ&hl=en>

Peer Reviewed Full Articles in Journals (* indicates Student)

1. Alvarado, M., **Kum, H.-C.**, Foster M, Gonzalez K., Ortega P., Lawley, M. (2017). Barriers to Remote Health Interventions for Type 2 Diabetes: A Systematic Review and Proposed Classification Scheme. *Journal of Medical Internet Research*,19(2), e28
2. Leroux, T.* , Cote, M., **Kum, H.-C.**, Dabney, A., Wells R. Transitioning to Patient-Centered Medical Homes: Associations with Appointment Availability. *Military Medicine*. *Military Medicine* (2017). In Print.
3. Leroux, T.* , **Kum, H.-C.**, Dabney, A., Wells R. (2016) Military Deployments and Mental Health Utilization Among Spouses of Active Duty Service Members. *Military Medicine* Oct 2016 Vol. 181, pp 1269-1274.
4. **Kum, H.-C.**, Stewart, C.J.* , Rose, R.A. & Duncan, D.F., Using big data for evidence based governance in child welfare, *Children and Youth Services Review* (2015), Volume 58, November 2015, Pages 127-136, ISSN 0190-7409, doi: 10.1016/j.childyouth.2015.09.014.
5. Elkins, A.D.* , Gorman, D.M., Maddock, J.E., **Kum, H.-C.**, & Lawley, M.A. (2015). The value of the frame: Painting complexity using two chronic disease models. *Journal of the International Society for the Systems Sciences: Proceedings of the 59th Annual Meeting of the International Society for Systems Sciences – 2015 Berlin, Germany*.
6. Cilenti, D., **Kum, H.-C.**, Wells, R., Whitmire, T., Goyal, R.* , and Hillemeier, M. (2015). Changes in North Carolina Maternal Health Service Use and Outcomes among Medicaid-enrolled Pregnant Women during State Budget Cuts. *Journal of Public Health Management & Practice*. Mar-Apr 2015 21(1):pp 208-213.
7. Hillemeier, M., Domino, M., Wells, R., Goyal, R.* , **Kum, H.-C.**, Cilenti, D., Whitmire, T., Basu, A. (2015). Effects of Maternity Care Coordination on Pregnancy Outcomes: Propensity-Weighted Analyses. *Maternal and Child Health Journal*. Jan 2015 19(1) pp121-127.
8. Ojinnaka, C. O.* , Choi, Y.* , **Kum, H.-C.**, Bolin, J. (2015). Predictors of Colorectal Cancer Screening: Does Rurality Play a Role? *The Journal of Rural Health*. Jan 2015 19.
9. **Kum, H.-C.**, Krishnamurthy, A., Machanavajjhala, A., and Ahalt, S. (2014). Tapping the Social Genome to Advance Society: A Vision for Putting Big Data to Work for Population Informatics, Editors. *IEEE Computer Special Outlook Issue*. Jan 2014. p. 56-63.
10. **Kum, H.-C.**, Krishnamurthy, A., Machanavajjhala, A., Reiter, M., and Ahalt, S. (2014). Privacy preserving interactive record linkage (PPIRL). *J Am Med Inform Assoc*, 2014;21:212–220.
11. Stewart, C.J.* , **Kum, H.-C.**, Barth, R.P., Duncan, D.F. (2014). Former foster youth: Employment outcomes up to age 30. *Children and Youth Services Review*, 2014. 36(0): p. 220-229.

12. Rajasekar A., **Kum, H.-C.**, Crosas M., et al. (2013). The DataBridge, *Science Journal ASE*. 2(1) 2013. Nominated for best paper award at ASE/IEEE International conf. on BigData 2013
13. Barth, R.P., Duncan, D.F., Hodorowicz, M.* , and **Kum, H.-C.** (2010). Felonious arrests of former foster care and TANF-involved youth. *Journal of the Society for Social Work & Research*, 2010. 1(2).
14. **Kum, H.-C.**, Duncan, D.F., and Stewart, C.J.* (2009). Supporting self-evaluation in local government via Knowledge Discovery & Data mining. *Government Information Quarterly*, 2009. 26(2):295-304
15. Chang, J.H. and **Kum, H.-C.** (2009). Frequency-based load shedding over a data stream of tuples. *Information Sciences*, 2009. 179(21): p. 3733-3744.
16. Duncan, D.F., **Kum, H.-C.**, Weigensberg, E. C.* , Flair, K. A., and Stewart, C. J.* (2008). Informing Child Welfare Policy and Practice Using Knowledge Discovery and Data Mining Technology via a Dynamic Web Site. *Child Maltreatment*, 2008. 13(4): p. 383-391.
17. **Kum, H.-C.**, Chang, J.H., and Wang, W. (2007). Benchmarking the effectiveness of sequential pattern mining methods. *Data & Knowledge Engineering*. 60(1): p. 30-50.
18. **Kum, H.-C.**, Chang, J.H., and Wang, W. (2006). Sequential pattern mining in multi-databases via multiple alignment. *Data Mining and Knowledge Discovery*. 12(2-3): p. 151-180.
19. Nyland, L., Prins, J., Yun, R. H., Hermans, J., **Kum, H.-C.**, & Wang L. (1997). Achieving Scalable Parallel Molecular Dynamics Using Dynamic Spatial Domain Decomposition Techniques. *Journal of Parallel and Distributed Computing*, V47, pp127-138. (SCI)

Peer Reviewed Full Articles in Proceedings

[In Computer Science, these are the premier venues. See Page, A. (1999). Best Practices Memo Evaluating Computer Scientists and Engineers For Promotion and Tenure. Computing.]

1. **Kum, H.-C.**, and Ahalt, S. (2013). Privacy-by-Design: Understanding Data Access Models for Secondary Data. *AMIA Summits Transl Sci Proc*, 2013. 2013: p. 126-30. **Nominated for best paper award.**
2. **Kum, H.-C.**, Krishnamurthy, A., Pathak, D., Reiter, M., and Ahalt, S. Secure Decoupled Linkage (SDLink) system for building a social genome. Poster and extended paper In *IEEE International Conf on BigData*. 2013.
3. **Kum, H.-C.**, Ahalt, S., and Pathak, D.* (2013). Privacy-Preserving Data Integration Using Decoupled Data, in *Security and Privacy in Social Networks*, Y. Altshuler, et al., Editors. 2013, Springer New York. p. 225-253. Book Chapter.
4. **Kum, H.-C.**, and Ahalt, S. (2011). Decoupled Data for Privacy Preserving Record Linkage with Error Management. in *Privacy, security, risk and trust (passat)*, IEEE third international conference on (SocialComp) 2011, MIT Boston.

5. Cheng, W.*, Ni, X., Sun, J., Jin, X., **Kum, H.-C.**, Zhang, X. and Wang, W. (2011). Measuring Opinion Relevance in Latent Topic Space, IEEE third International conference on social computing. (SocialComp) 2011, MIT Boston.
6. **Kum, H.-C.**, Chang, J.H., and Wang, W. (2007). Intelligent sequential mining via alignment: Optimization techniques for very large DB, in Advances in Knowledge Discovery and Data Mining, Proceedings, Z.H. Zhou, H. Li, and Q. Yang, Eds. p. 587-597. Proceeding reprinted as Book Chapter
7. **Kum, H.-C.**, Paulsen, S., and Wang, W. (2005). Comparative study of sequential pattern mining models, in Foundations of Data Mining & Knowledge Discovery, T.Y. Lin, et al. pp43-70. Proceeding reprinted as Book Chapter.
8. **Kum, H.-C.**, Duncan, D., and Wang, W. (2004). Understanding social welfare service patterns using sequential analysis, in Proceedings of the annual national conference on Digital government research. Digital Government Society of North America: Seattle, WA. p. 1-2.
9. **Kum, H.-C.**, Duncan, D., Flair, K., and Wang, W. (2004). Successfully adopting IT for social welfare program management, in Proceedings of the annual national conference on Digital government research. Digital Government Society of North America: Seattle, WA. p. 1-9.
10. **Kum, H.-C.**, Pei, J., Wang, W., and Duncan, D. (2003). ApproxMAP: Approximate mining of consensus sequential patterns. Proceedings of the Third Siam International Conference on Data Mining, ed. D. Barbara and C. Kamath. pp311-315. Full paper published as book chapter in *Mining Sequential Patterns from Large Data Sets: The Kluwer International Series on Advances in Database Systems, Vol. 28*. pp138-158. Springer. Technical Report TR02-031, UNC-CH.
11. **Kum, H.-C.**, Duncan, D., Flair, K., and Wang, W. (2003). Social welfare program administration and evaluation and policy analysis using knowledge discovery and data mining (KDD) on administrative data, in Proceedings of the annual national conference on Digital government research. Digital Government Society of North America: Boston, MA. p. 1-6.
12. Nyland, L., Prins, J., Yun, R. H., Hermans, J., **Kum, H.-C.**, & Wang L. (1998). Modeling Dynamic Load Balancing in Molecular Dynamics to Achieve Scalable Parallel Execution. *IRREGULAR*, pp356-365

Peer Reviewed Conference Presentations, Tutorials, Abstracts and Posters

1. **Kum, H.-C.** (2016). K-Anonymity Based Privacy Risk Budgeting System for Interactive Record Linkage. Oral Presentation. 2016 International Population Data Linkage Conference. Swansea, UK.
2. **Kum, H.-C.** (2016). Incremental Interactive Record Linkage using Human Intelligence Tasks (HITs). Oral Presentation. 2016 International Population Data Linkage Conference. Swansea, UK.

3. **Kum, H.-C.**, & Ohsfeldt R. (2016). Comparison of Data to Decision Models for a Data Consortia. Presented at the 2016 Annual ISPOR International Meeting.
4. Christen, P., **Kum, H.-C.**, Wang, Q., Vatsalan, D. Population Informatics using Big Data. Tutorial at Pacific Asia Knowledge Discovery and Data Mining Conference (PAKDD) 2016.
5. Sasangohar, F., Benzer, J., **Kum, H.-C.**, Creech, S.K. Collaborative Management of PTSD Treatment through Smartphone Apps Validated through Patient-Centered Design. Poster Presentation at the 23rd NIMH Conference on Mental Health Services Research, MHSR 2016: Harnessing Science to Strengthen the Public Health Impact. Bethesda, MD.
6. Brown, E.K., Benzer, J.K., Creech, S.K., **Kum, H.-C.**, Lawley, M., & Sasangohar, F. (June, 2016). Collaborative Management of PTSD Treatment through Smartphone Apps: What is Available and Accessible? Poster presented at the AcademyHealth Annual Research meeting, Boston, MA and to the International Society for Traumatic Studies annual meeting. Dallas, TX.
7. Rodriguez, C.P., Sasangohar, F., Benzer, J., **Kum, H.-C.**, Creech, S.K. (2016). Mobile Health Applications for Addressing Post-Traumatic Stress Disorder (PTSD): A Literature Review. Poster Presentation at the International Society for Traumatic Studies annual meeting. Dallas, TX.
8. Chung A., Shin G., Chen H., Mane K., **Kum, H.-C.** (2016). Reimagining the Personal Health Record: Patients as Co-Designers. *Am Med Inform Assoc (AMIA) 2016 Annual Symposium*.
9. Ghaffari, A. Wells, R., Armstrong, T., Creel, L., **Kum, H.-C.**, Brossart, D., Roper-Coleman, S., Sunbury, T. (2015) Applying relational coordination to inter-agency teamwork and patient experiences with providers. Oral presentation at Organizational Theory in Health Care Conference, Richmond, VA, May 27-29, 2015 (Ghaffari presenting).
10. Tamayo, L., **Kum, H.-C.**, Wells, R., Du, Y. Roper-Coleman, S., Sunbury, T. (2015) Health Status and Health Experience among Adult, Hispanic, Frequent ED Users. *Academy Health's 2015 Annual Research Meeting (ARM)*. Accepted as a poster.
11. Goyal, R. K., Domino, M. E., Wells, R. S., **Kum, H.-C.**, & Hillemeier, M. M. (2014). Do Children With Special Needs Receiving Care Coordination Have Greater Access To Primary Care? *Value in Health*, 17(3), A146. Presented at the 2014 Annual ISPOR International Meeting doi: 10.1016/j.jval.2014.03.848
12. **Kum, H.-C.** Krishnamurthy A., Dusetzina S. (2014) Privacy Preserving Interactive Record Linkage: Privacy beyond Anonymity. *Academy Health's 2014 Annual Research Meeting (ARM)*. Accepted as a poster in the HIT theme. Also presented at the HIT interest group meeting.
13. Sunbury, T., **Kum, H.-C.** Ghaffari, A., Gregory, S. (2014) Building an Efficient Hybrid Human Machine System for Ongoing Record Linkage. *Academy Health's 2014 Annual Research Meeting (ARM)*.
14. **Kum, H.-C.** (2014). Safe Data Access Models for Population Informatics Research. Oral Presentation. 2014 International Health Data Linkage Conference. Vancouver, CA

15. **Kum, H.-C.** (2014). A Secure Computerized Third Party Linkage Software Design. Rapid Fire Poster Presentation. 2014 International Health Data Linkage Conference. Vancouver, CA.
16. Bauer R., **Kum H.-C.**, and Reiter M. Protecting Personal Information with Secure Execution Technology, *Am Med Inform Assoc (AMIA) 2013 Annual Symposium*
17. **Kum, H.-C.**, Pathak D., Sanka, G., and Ahalt, S. (2013). Privacy Beyond Anonymity: Decoupling Data using Encryption, *American Medical Informatics Association (AMIA) joint summits on translation science: clinical research informatics*.
18. **Kum, H.-C.**, Moore, T. D., Stewart, C. J., & Dineen, M. (2012). Decision Support Systems and Informatics for Child Welfare Administrative Data to Inform Practice and Policy. *The 18th Nat'l Conf on Child Abuse and Neglect, Celebrating the Past ~ Imagining the Future*. Apr 2012.
19. Moore, T. D., **Kum, H.-C.**, Stewart, C. J., Smith, S., Staysa, M. J., Dineen, M. (2012). Building Capacity for Child Welfare Research through Improving Data Infrastructure and Culture Around Data Usage. *16th Annual Conf. on Society for Social Work and Research (SSWR)*. Jan 2012.
20. **Kum, H.-C.**, Barth, R., Stewart, C. J., Lee, C. K. (2012). Coming of Age: Employment Outcomes for Youth Who Age Out of Foster Care Through Their Middle to Late Twenties. *16th Annual Conference on Society for Social Work and Research (SSWR)*. Jan 2012.
21. **Kum, H.-C.**, (2011). An Effective Model for Using Administrative Data to Inform Social Services Policy, Practice, and Management. *15th Annual Conference on Society for Social Work and Research (SSWR): Emerging Horizon for Social Work Research*. Jan 2011.
22. **Kum, H.-C.**, Meyer, D. Ahn, H., Rolock, N., Gabel, G. (2011). Roundtable on Building and Maintaining An Effective Information System of Administrative Data at Universities in Partnership with State Agencies. *15th Annual Conference on Society for Social Work and Research (SSWR)*. Jan 2011.
23. **Kum, H.-C.**, Duncan, D. F., Bowers, H., & Cambridge, D. (2009). Linking across multiple databases with less than perfect data. *The 12th National Child Welfare Data and Technology Conference (NRC-CWDT)*. June 2009.
24. **Kum, H.-C.**, D.F. Duncan, and K.A. Flair, A dynamic website for county level child welfare outcome measures, in Proceedings of the 2008 international conference on Digital government research. 2008, Digital Government Society of North America: Montreal, Canada. p. 383-384.
25. Duncan, D. F., **Kum, H.-C.**, & Barth, R. (2008). Employment and Felonious Arrests of Former Foster Care Youth. *The 11th National Child Welfare Data and Technology Conference (NRC-CWDT)*. July 2008.
26. Macomber J., McDaniel, M., Cuccaro-Alamin S., & **Kum, H.C.** (2007). Linking Child Welfare & Employment Data: Assessing Extended Outcomes for Youth Aging Out of Foster Care.

The 10th National Child Welfare Data and Technology Conference (NRC-CWDT). July 2007.

27. Duncan, D. F., **Kum, H.-C.**, & Johnson, K. (2006). Effectively Sharing Information with 100 counties. *The 9th Nat'l Child Welfare Data and Tech. Conf. (NRC-CWDT)*. July 2006.
28. **Kum, H.-C.**, Duncan, D., al., Adopting IT for effective management of social welfare programs, in Proceedings of the 2004 annual national conference on Digital government research. 2004, Digital Government Society of North America: Seattle, WA.
29. **Kum, H.-C.**, et al., Management assistance for Work First via a dynamic website, in Proceedings of the 2003 annual national conference on Digital government research. 2003, Digital Government Society of North America: Boston, MA.
30. **Kum, H.-C.** and P. Dewan, Supporting real-time collaboration over wide area networks, in Proceedings of the 2000 ACM conference on Computer supported cooperative work. 2000, ACM: Philadelphia, Pennsylvania, USA. p. 355.

Invited Papers and Presentations

1. **Kum, H.-C.** K-Anonymity Based Privacy Risk Budgeting System for Interactive Record Linkage. Isaac Newton Institute for Mathematical Sciences program on Data Linkage and Anonymisation (Fall 2016) Workshop on Data Linkage: Techniques, Challenges and Applications. Cambridge UK. Invited Seminar.
2. **Kum, H.-C.** Social Genome: Putting Big Data to Work for Population Informatics. First International Workshop on Population Informatics for Big Data. ACM-SIGKDD 2015. Aug 2015. Sydney, Australia. Invited **Keynote**.
3. **Kum, H.-C.** Research Data Infrastructure. Korea Institute of Science and Technology Information (KISTI). Aug 2015. Dae Jeon, Korea. Invited Seminar.
4. **Kum, H.-C.** Social Genome: Putting Big Data to Work for Population Informatics. *Industrial & systems Engineering Graduate Seminar (ISEN681)*. Texas A&M University. Department of Industrial & Systems Engineering. April 2016. College Station, TX. Invited oral presentation.
5. **Kum, H.-C.** Social Genome: Putting Big Data to Work for Population Informatics. *Computer Science and Engineering Graduate Seminar (CSCE681)*. Texas A&M University. Department of Computer Science and Engineering. February 2015. College Station, TX. Invited oral presentation.
6. **Kum, H.-C.** Population Informatics and the Social Genome. *Texas A&M Big Data Workshop*. Texas A&M University. February 2015. College Station, TX. Invited oral presentation.
7. **Kum, H.-C.** Applying Data Science to Advance the Health and Welfare of Populations. *Annual Conference on Society for Social Work and Research (SSWR)*. New Orleans, LA. Invited half day workshop. Jan 2015.

8. Wells, R., Cilenti, D., **Kum, H.-C.**, Hillemeier, M., Domino, M. Effects of reduced Medicaid funding for maternity outreach and postpartum services. Public Health Systems Research Close-up Briefing. Invited oral presentation, October 2014. Washington, DC. (Wells & Cilenti presented)
9. **Kum, H.-C.** Understanding Big Data Analytics for Research. *Tate Lecture*. University of North Carolina at Chapel Hill. School of Social Work. August 2014. Invited oral presentation.
10. **Kum, H.-C.** Social Genome: A Vision for Putting Big Data to Work to Advance Society, RTP 180. Invited oral presentation. August 2014.
11. **Kum, H.-C.** Population Informatics and the Social Genome. Invited panel for a Special Session on Big Data in Social Science at the 2014 ASE/IEEE International conference on Big Data Science and Computing. May 27-31, 2014. Stanford University.
12. **Kum, H.-C.** Privacy preserving data integration via encryption for Population Health Informatics. *Computer Science and Engineering Seminar*. Texas A&M University. Department of Computer Science. October 2012. Invited oral presentation.
13. **Kum, H.-C.** What is datamining and why does it matter to social work? *Tate Lecture*. University of North Carolina at Chapel Hill. School of Social Work. September 2012. Invited oral presentation.
14. **Kum, H.-C.** Decoupled Data for Privacy Preserving Record Linkage with Error Management. *KAIST University, Korea. Division of Web Science & Technology*. January 2012. Dae Jeon, Korea. Invited Seminar.
15. **Kum, H.-C.** (2012). Using administrative data for evaluation, policy, and research. *The Korean Ministry of Health and Welfare. Office of Social Welfare Policy. Bureau of Welfare Information Integrated Management*. January 2012. Seoul, Korea. Invited oral presentation.
16. **Kum, H.-C.** Building a secure federated government KDD information system from the bottom up for child welfare practice, policy, and research. *Child Welfare 360° : Child Welfare and Technology*. Center for Advanced Studies in Child Welfare. 2011. Invited Article.
17. **Kum, H.-C.** ApproxMAP: Intelligent Sequential Pattern Mining via Alignment. *SAS 12th Annual Data Mining Conference: M2009*. October 2009. Invited oral presentation.

Other Work (Letters, Policy Briefs, White Papers)

1. Ahalt, S., et al. Establishing a national consortium of data science. Renaissance Computing Institute (RENCI), University of North Carolina at Chapel Hill. White Paper. One of eleven contributing authors. July 2012. http://data2discovery.org/dev/wp-content/uploads/2012/09/NCDS-Consortium-2-pager_0709121.pdf
2. **Kum, H.-C.**, Ahalt, S., and Carsey, T.M. Dealing with Data: Governments Records. *Science*, 2011. 332(6035): p. 1263-1263. Letter.

3. Urban Institute. Coming of Age: Employment Outcomes for Youth who Age Out of Foster Care through Their Middle Twenties. Report published for Assistant Secretary for Planning and Evaluation (ASPE), US Department of Health and Human Services (HHS). Policy Brief. 2008. North Carolina study co-lead and one of twelve contributing authors. <https://aspe.hhs.gov/basic-report/coming-age-employment-outcomes-youth-who-age-out-foster-care-through-their-middle-twenties>

Submitted and Working Papers

1. Hillemeier, M., Domino, M., Wells, R., **Kum, H.-C.**, Cilenti, D. Does Maternity Care Coordination Influence Perinatal Health Care Utilization? Evidence from North Carolina. *Maternal and Child Health Journal*. Submitted. R&R.
2. **Kum, H.-C.**, Gifford, B., and Ferdinand A. Understanding Information Privacy for Population Informatics: Application of Privacy by Design to Record Linkage. *Public Administration Review: Symposium – Using Administrative Data for Social Policy Research*. Submitted.
3. **Kum, H.-C.**, Sunbury, T., O’Brian S., and Ohsfeldt, R. VIEW: A Framework for Reproducible Interactive Record Linkage for Big Data.
4. Rodriguez-Paras, C., Brown, E., Tippey, K., Creech, S.K., Lawley, M., **Kum, H.-C.**, Sasangohar, F. & Benzer, J.K., Investigating Post-Traumatic Stress Disorder (PTSD) Mobile Health (mHealth) Applications Usage and Validation: An App Investigation and Scoping Literature Review

HONORS

The Paul Hardin Dissertation Fellowship – Royster Fellows (2004)
The UNC-CH Graduate School’s Dean’s Award (2003)
Nominated for Best Paper Award, 2013 AMIA Joint Summits on Translation Science, Clinical Research Informatics
Nominated for Best Paper Award at ASE/IEEE International conference on BigData 2013

GRANTS

[The Kum portion is an estimate based on role on project]

Currently Funded

Patient-Centered Outcomes Research Institute (PCORI), 2/01/2017-3/31/2020; **H.-C. Kum (PI)**; A. Ferdinand (co-PI). Privacy Preserving Interactive Record Linkage (PPIRL) via Information Suppression.

The National Institute for Occupational Safety and Health (NIOSH) & Texas Transportation Institute, 09/30/2016 - 09/29/2019; E. Shipp (PI), **H.-C. Kum (site-PI)**; *Centers for Agricultural Safety and Health (U54)*.

TAMU SPH & Bush (Texas A&M School of Public Health and The Bush School of Government and Public Service), 8/01/2016-7/31/2017; **H.-C. Kum (PI)** Laura Dague (PI) Michael Morrissey (co-I); Justin Bullock (co-I); *Hospital Mergers and Hospital Performance*.

TEES (Texas A&M Engineering Experiment Station Strategic Areas Interdisciplinary Research Seed Grant), 8/01/2016-7/31/2017; F. Sasangohar (PI), **H.-C. Kum (co-PI)**, J. Benzer (co-PI); *Effective Management of PTSD: A Systematic Design and Investigation of a Novel PTSD Information System for Veterans.*

USDA [2014-08397], 2/01/2015-1/31/2020; Joseph Sharkey (PI); **H.-C. Kum (Co-Investigator)**; *Salud Para Usted y Su Familia* [Health for You and Your Family]: Family-Focused Childhood Obesity Prevention. The long-term goal of *Salud Para Usted y Su Familia* [Health for You and Your Family (SPUSF)]

TX-HHSC, Texas Health and Human Services Commission; 2/01/2013 – 4/30/2017; Robert Ohsfeldt (PI); **H.-C. Kum (Co-PI)**; Texas Healthcare Transformation & Quality Improvement Program Demonstration Waiver.

Jointly funded by CMS and Meadows Foundation; 09/01/2014 – 4/30/2017; Rebecca Wells (PI); **H.C. Kum (Co-PI)**; Integration of primary care into services for people with serious mental illness (SMI).

Completed

TEES & TAMHSC (Texas A&M Engineering Experiment Station & Health Science Center Seed Grants for Interdisciplinary Research in Big Data), 2/01/2016-1/31/2017; **H.-C. Kum (PI)**; Michael Morrissey (co-PI); Dilma Da Silva (co-PI); Mark Fossett (co-PI) *Virtual Social Genome Data Library: A Secure Data Infrastructure for Population Informatics.*

PCORI; 05/01/15-01/31/16; Mark Lawley (PI); **H.C. Kum (Co-PI)**; Diabetes Education and Wellness through Faith-Based Organizations in Texas.

TX-DSHS, Texas Department of State Health Services; 6/01/2014 – 8/31/2015; Tiffany Radcliff (PI); **H.C. Kum (Co-Investigator)**; Analysis of Medicaid Fee-for-Service Data for Clostridium Difficile Patients in Texas, 2011-2013 Program.

NSF Office of Cyberinfrastructure OCI-1247652 NSF-NIH Joint Big Data Initiative; 11/01/2012 – 10/31/2015; A. Rajasekar (PI); **H.-C. Kum (Co-PI)** DataBridge: A Sociometric System for Science and Engineering Datasets and Collections; Collaborative proposal with Harvard University, North Carolina A&T State University, and Odum Institute and RENCi at UNC.

NC-DHHS, NC Division of Social Services; 07/01/2007-06/30/2014; Dean Duncan (PI); **H.-C. Kum (Co-PI)**; Creating Indicators and Improving Outcomes: Analytic Assistance for Child Welfare, Work First, Food and Nutrition Services, and Employment and Training and Career Start in NC; Annually renewed since 2000. Dr. Kum has been the technical lead and information system architect since 2000.

Robert Wood Johnson Foundation Public Health Practice Based Research Network (RWJF Public Health PBRN); 02/01/2011-08/31/2012; Rebecca Wells (PI); **H.-C. Kum (Co-Investigator)**; Reimbursement policy changes and its effect on local public health service outcomes;

UNC Food Research Program. Carolina Population Center; 05/01/2012-04/30/2013; **H.-C. Kum (PI)**; Pilot Project on Computational Nutrition with Barry Popkin. nuTRUtion: Getting towards the truth about our food environments.

US-DHHS ASPE subcontract with Urban Institute; 01/01/2005-12/31/2008; Rick Barth (PI); **H.-C. Kum (Co-Investigator)**; Extended Employment Outcomes for Youth Aging Out of Foster Care;

NC-DHHS, NC Division of Social Services; 07/01/2004-06/30/2007; Dean Duncan (PI); **H.-C. Kum (Co-PI)**; Assessing Performance in Work First;

NC-DHHS, NC Division of Social Services; 04/15/2005-06/30/2007; Dean Duncan (PI); **H.-C. Kum (Co-Investigator)**; Assistance in Assessing Child Welfare Outcomes;

NC-DHHS, NC Division of Social Services; 04/01/2004-06/30/2007; Dean Duncan (PI); **H.-C. Kum (Co-Investigator)**; Evaluation of the NC Food Stamp Employment and Training Initiative;

NC-DHHS, NC Division of Medical Assistance; 07/01/2000-10/31/2001; Dean Duncan (PI); **H.-C. Kum (GRA)**; Tracking Transitions from Work First to Medicaid; Lead and completed most of the work in the project mentored by the PI.

OTHER RESEARCH PRODUCTS

Timely Open Data Web Portal since 2000

Duncan, D.F., **Kum, H.-C.**, Flair, K.A., et al. (2015). Management Assistance for Child Welfare, Work First, and Food & Nutrition Services in North Carolina. From University of North Carolina at Chapel Hill Jordan Institute for Families website.

- URL: <http://ssw.unc.edu/ma/>
- The web portal was one of the first of its kind when it was released in 2000.
- Currently it has an average of 500 visits weekly
- The web portal has become the authoritative source of information of welfare related data for North Carolina in numerous federal, state, and independent reports such as (1) KIDS COUNT (The Annie E. Casey Foundation and Action for Children North Carolina), (2) Numerous NC Budget & Tax Center (BTC) Briefs on Work First, Food and Nutrition Services (formerly known as food stamps), (3) North Carolina Child Health Report Card (Action for Children NC)
- As the main developer of the web portal, designed and implemented SIML, a template language for an extensible data driven decision support system to support policy making. Using SIML, we publish a comprehensive set of up to date summary statistics that Child Welfare, Work First, and Food & Nutrition Services in North Carolina at the county level over time on a dynamic website.

Open Source Code Release: ApproxMAP (Sequential Pattern Mining)

- At the continued request of researchers who wanted to use the software after reading the published paper, I released the software in 2010, 6 years after the work was completed
- Over 200 downloads internationally between Aug 2010 to Jun 2015
- In total, there are over 100 citations of this work worldwide. To date, it is the only method for finding trends in sequences of sets such as detecting common patterns in sets of symptoms over time.
- <https://github.com/hckum/approxmap>

HPM Open Data Initiative

- Release and maintain updated open data sources for Health Services Research along with code and documentation that make it easy to use the data properly
- Currently experimental for use only within the department
- Data Sets
 - American Hospital Association Annual survey of hospitals
 - Texas Inpatient Public Use Data Files
 - Area Resource Files
 - Planned: Medicare hospital cost report data

TEACHING AND MENTORSHIP

[As an interdisciplinary data scientist, Dr. Kum's main job in teaching and supervising public health and social work students is to teach them about the basics of data and programming, how it can be converted to useful information for policy, evaluation, and research, and how to collaborate successfully with computer scientists. Her main job in teaching and supervising computer science students is to teach them health and human services context, and help them understand what part of the project can be converted to a nice computer science project, and what questions they have to ask their collaborators to get clarification on their roles]

Classes

Texas A&M University, College Station, TX

- Health Information Management Systems. Health Policy & Management, MHA. New course development
- Data Science for Health Services Research. Health Policy & Management, Doctoral. New course development
- Data Science in Public Health. Health Policy & Management, MPH. New course development
- MS Thesis Research, Computer Science & Engineering, MS.
- Undergraduate Independent Research Course. Computer Science & Engineering, BS.

The University of North Carolina at Chapel Hill, NC

- Power Tools for the Mind. Computer Science, Undergraduate. A computing class for non-CS majors.
- Introduction to scientific programming (Matlab). Computer Science, Undergraduate. An introduction to programming to non-CS majors. Co-teach with Stanley Ahalt
- Seminar on data science and population informatics. Computer Science, Graduate and Undergraduate. Weekly research seminar for 1 credit hour
- Honor's Thesis in Computer Science. Computer Science, Undergraduate.
- Software Engineering Practicum. Computer Science, Undergraduate.
- Master's Research. Computer Science, MS.
- Reading and Research. Computer Science, PhD.
- Research Practicum I. Social Work. Doctoral.
- Research Practicum II. Social Work. Doctoral.

Other Non-credit courses

- 2005 – current. Developed an online self-study SAS programming curriculum for training Research Assistants (RA) on the project. Trained 11 students.
- <http://www.unc.edu/~kum/ma/pub/sas>

Advising and Mentoring

PHD COMMITTEE

Debra Tan (PhD May 2017; Texas A&M Health Policy and Management)
Tentative Title: Outcomes research on liver cancer (*Chair*)

Loida Tamayo (PhD May 2017; Texas A&M Health Policy and Management)
Tentative Title: Patient Experience in the ED (*Co-Chair*)

Affan Ghaffari (PhD May 2017; Texas A&M Health Policy and Management)
Tentative Title: Relational Coordination (*Co-Chair*)

Member

Todd Leroux (PhD Dec 2015; Texas A&M Health Policy and Management)
Title: Evaluating Aspects of Health Care Delivery in the U.S. Military: Medical Separations, Mental Health Utilization, and Primary Care Appointment Availability

Amber Elkins (PhD Dec 2015; Texas A&M Health Promotion and Community Health Sciences)
Title: Systems Approaches to Understanding Type II Diabetes

Joy Stewart (PhD May 2016; UNC-CH School of Social Work)
Title: Employment Outcomes for Children in the Child Welfare System

Mónica Pérez Jolles (PhD May 2014; UNC-CH, Health Policy and Management)
Title: Citizen Participation in Child Protective Service Agency and Impact on Agency Performance and Services Outcome

External Ph.D. dissertation examiner

Brian P. Ballsun-Stanton (PhD May 2012; University of New South Wales, Australia)
Title: Asking About Data

MS COMMITTEE

Member

Richa Surbhi (MS May 2017; TAMU, Computer Science & Engineering)
Maria Correa (MS May 2017; TAMU, Industrial & Systems Engineering)
Abhishek Vinod Kumar Joshi (MS May 2017; TAMU, Computer Science & Engineering)

Jaideep Ray (MS May 2016; TAMU, Computer Science & Engineering)
Title: Sketch-Seeker

Deepika Mahalingam (MS May 2011; UNC-CH, Computer Science)
Title: From Temporal Expressions To Symptom Onset Date Identification In Emergency Department Notes – A Temporal Information Extraction Process.

UNDERGRADUATE HONORS THESIS ADVISOR

Gautam Sanka (BS May 2013; UNC-CH, Computer Science)
Title: Implementing Mobile health records in low-resource settings

Dennis Given (BS May 2012; UNC-CH, Computer Science)
Title: NuTRUtion Nation – A comparison study of the impact of different OCR software, preprocessing, and postprocessing on nutrition fact panel images.

Ren Bauer (BS Dec 2011; UNC-CH, Computer Science)
Title: SIML - A template language for an extensible data driven decision support system to support policy making.

HIGHLIGHTS OF RECENT SERVICE

TAMU Committee

- TAMU Data Science Workgroup
- School of Public Health, HPM Department IT & Facilities committee chair
- School of Public Health, HPM Department PhD committee
- School of Public Health, HPM Department search committee
- School of Public Health, HPM Department MPH committee
- School of Public Health Research Committee (alternate member)
- School of Public Health Data Science Workgroup

External Workgroup

- Texas State IRB Board at Texas Department of State Health Services
- Data Linkage Repository (dlrep) workgroup. 2016-current; Chair.
- Invited to participate in the NSF Big Data Regional Innovation Hubs National Meeting (Nov 2015).
- Improving Methods for Linking Secondary Data Sources for CER/PCOR. PCORI funded project Advisory Committee, 2014-current;
- Public Health Activities and Services (PHAST) Advisory Committee, 2014-2016: PHAST is a multidisciplinary, practice-based, national research collaborative working to develop and support systems that collect a uniform set of public health services data and to provide a comprehensive, accessible database for answering practice-based research questions to support evidence based policies in public health.
- Establishing a national consortium for data science, 2012. RENC UNC-CH: This workgroup worked together to launch the National Consortium For Data Science (NCDS). NCDS is a collaboration of leaders in academia, industry and government formed to address the data challenges of the 21st century. <http://data2discovery.org/>

Conference Officer/Program Committee Member

- NSF Annual International Digital Government Research Conference (DGO) proceedings published on ACM Digital library: Program committee in 2009-2014, Demo and Poster co-chair in 2010 & 2011.
- Reviewer for AMIA Annual Symposium
- Reviewer for AMIA Joint Summits on Translational Science

Grant Reviewer:

- NIH ad hoc Review Panel for Big Data to Knowledge (BD2K) Development of Software Tools and Methods for Biomedical Big Data in Targeted Areas of High Need (U01);
- UK MRC (Medical Research Council) on behalf of the 10 largest UK funders of health research - a multimillion pound UK initiative to advance health through informatics research and data linkage by creating E-health centers

Ad hoc paper reviewer:

- Editorial Board for Data and Knowledge Engineering (DKE, 2006-2008).
- Editorial Review Board: Journal of Society for Social Work and Research (JSSWR)
- Ad hoc reviewer for the following journals:
 - Journal of American Medical Informatics Association (JAMIA)
 - PLoS One
 - Journal of Medical Internet Research (JMIR)
 - Computer Methods and Programs in Biomedicine

- Hospital Topics
- Journal of Public Health Management & Practice
- Government Information Quarterly
- Knowledge and Information Systems (KAIS)
- IEEE Transaction on Knowledge and Data Engineering (TKDE).
- ACM Transactions on Knowledge Discovery from Data (TKDD).
- Information Sciences.
- ACM Computing Surveys.
- The Computer Journal of Oxford Press.
- Applied Stochastic Models in Business and Industry.

Record Linkage Consultant, Urban Institute: As an expert on record linkage, I consulted on integrating child welfare administrative data from the Texas DFPS (Dept. of Family and Protective Services) and vital statistics data from the Texas DSHS (Department of State Health Services). The project investigated Latino children of immigrants in the Texas child welfare system.