

Curriculum Vitae

Kansas State University
Dept. of Industrial and Manufacturing Systems Eng.
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Chih-Hang John Wu, Ph.D.

Education

- Aug 1989 – May 1993* **Pennsylvania State University**
Doctor of Philosophy, Operations Research
University Park, PA, United States
Dissertation: *Solving Large-Scale Nonlinear Network Problems with Relaxation and Decomposition Algorithms*. 06/1993, Degree: Ph.D., Supervisor: Jose A. Ventura
- Aug 1989 – Feb 1992* **Pennsylvania State University**
Master of Science, Operations Research
University Park, PA, United States
Thesis: *Automated Inspection of Elliptical Profiles*. 01/1992, Degree: Master of Science, Supervisor: Jose A. Ventura
- Aug 1988 – May 1989* **University of Missouri, Columbia**
Industrial Engineering
Columbia, MO, United States
- Aug 1980 – Jun 1984* **National Cheng Kung University**
Bachelor of Science, Industrial Management
Tainan, Taiwan, Republic Of China

Research Experience

- July 2007 – present* **Co-Director**
Healthcare Operations Research Center, Kansas State University
Manhattan, KS, United States
- July 1995 – present* **Co-Director**
Non-Contact Precision Measurement Lab, Kansas State University
Manhattan, KS, United States
- July 2021 – present* **Professor**
Department of Industrial and Manufacturing Systems Engineering,
Kansas State University,
Manhattan, KS, United States
- July 1999 – May, 2021* **Associate Professor**
Department of Industrial and Manufacturing Systems Engineering,
Kansas State University,
Manhattan, KS, United States
- Aug 1993 – June, 1999* **Assistant Professor**
Department of Industrial and Manufacturing Systems Engineering,
Kansas State University,
Manhattan, KS, United States

Professional Experience

<i>Jan. 1998 – May 2010</i>	Chief Operating Officer Silicos Technology Inc. Manhattan, KS, United States
<i>June 1999 – Aug. 2003</i>	Chief Executive Officer Alchemy Technology Inc., Manhattan, KS, United States
<i>Jan. 1998 - Present</i>	Chairman of the Board of Director Global Paragon Corp. Taipei City, Taiwan, R.O.C.
<i>Apr. 1997 – March, 2003</i>	General Manager Paragon Technologies Inc., Manhattan, KS, United States
<i>Apr. 1986 – May 1988</i>	Production Manager FlyTech Technology Co., LTD, Taipei, Taiwan, Republic of China

AWARDS

Teaching:

Kansas State University	Gisela and Warren Kennedy – Carl and Mary Ice Cornerstone Teaching Scholar	<i>Aug-2019 – June- 2024</i>	<i>47,500</i>
Kansas State University	Outstanding Teacher Award - Department of Industrial and Manufacturing Systems Engineering	<i>May-2019</i>	<i>\$500</i>
Kansas State University	Outstanding Teacher Award - Department of Industrial and Manufacturing Systems Engineering	<i>May-2015</i>	<i>\$500</i>
Kansas State University	Outstanding Teacher Award - Department of Industrial and Manufacturing Systems Engineering	<i>Apr-2012</i>	<i>\$500</i>
Mercy Regional Medical Center, Manhattan, KS	Process Improvement Training for Leaders	<i>May-2010</i>	<i>\$5,000</i>
Kansas State University	Outstanding Teacher Award - Department of Industrial and Manufacturing Systems Engineering	<i>Apr-2004</i>	<i>\$500</i>
Kansas State University	Hollis Teaching Award - Finalist	<i>Apr-1997</i>	

Research:

National Level Award			
2018 IISE Research Conference	Best Paper Award – Simulation and Modeling	<i>May-2018</i>	\$1,000
2016 IISE Research Conference	Best Paper Award – Healthcare Engineering	<i>May-2016</i>	\$1,000
Pre-stress Concrete Institution (PCI)	Daniel P. Jenny Research Fellowship	<i>Aug-2004</i>	\$18,000
Institute of Industrial Engineering	IIE Dissertation Award	<i>Feb-1994</i>	
University Level Awards			
University Transportation Center, Kansas State University	Graduate Scholarship Award	<i>Jan-2014</i>	\$2,500
University Transportation Center, Kansas State University	Graduate Scholarship Award	<i>Aug-2013</i>	\$2,500
University Transportation Center, Kansas State University	Graduate Scholarship Award	<i>Aug-2012</i>	\$5,000
Mercy Regional Medical Center, Manhattan, KS	Process Improvement Training for Leaders	<i>May-2010</i>	\$5,000

Funded Research Grants (Total: \$6,509,449; My Portion: \$2,556,368.71)
(Federal funded projects are in **bold**)

Funding Agent, Title, Time Period, Amount, Role, Percent, My Portion

1. **National Aeronautics & Space Administration (NASA), Multifunctional Additively Manufactured Ceramics for Aerospace Applications, 7/15/2022-7/14/2025, \$100,000, PI-100%, 100,000.**
2. **Department of Transportation (DOT) Federal Railroad Administration (FRA), Quantifying the Effect of Prestressing Steel and Concrete Variables on the Transfer Length in Pretensioned Concrete Crossties, 03/01/2018 - 06/30/2019, \$318,648, Co-PI,25%, \$79,662.00**
3. **Department of Transportation (DOT) Federal Railroad Administration (FRA), Developing Qualification Tests to Ensure Proper Selection and Interaction of Pretensioned Concrete Railroad Tie Materials, 03/01/2016 - 02/28/2017, \$306,903.00, Co-PI,25%, \$76,725.75**
4. **Department of Transportation (DOT) Federal Railroad Administration (FRA), Developing Qualification Tests to Ensure Proper Selection and Interaction of Pretensioned Concrete Railroad Tie Materials,03/01/2015 - 02/28/2016, \$622,083.00, Co-PI,25%, \$155,520.75**
5. **Department of Transportation (DOT) Federal Railroad Administration (FRA), Quantifying the Effect of Prestressing Steel and Concrete Variables on the Transfer Length in Pretensioned Concrete Crossties (2nd Project Extension), 05/01/2011 - 03/31/2016, \$24,937.00, Co-PI,28%, \$6,982.36**
6. **Department of Transportation (DOT) Federal Railroad Administration (FRA), Quantifying the Effect of Prestressing Steel and Concrete Variables on the Transfer Length in Pretensioned Concrete Crossties (2nd Project Extension), 05/01/2011 - 12/31/2015, \$656,686, Co-PI,28%, \$183,872.08**
7. Via Christi, Wichita, KS, Modeling Core Processes at Mercy Regional Hospital at Manhattan,01/01/2013 - 12/31/2013, \$96,017, Co-PI,50%, \$48,008.50
8. Children Mercy Hospital, Kansas City, MO, Predictive Scheduling Model, 01/01/2013 - 12/31/2013, \$46,472, Co-PI, 50%, \$23,236.00
9. Manhattan Mercy Hospital, Manhattan, KS, Improved ER Workflow and Supplies Inventory Management, 08/01/2012 - 12/31/2012, \$3,000, Co-PI,50%, \$1,500.00
10. **Department of Transportation (DOT) Federal Railroad Administration (FRA), Quantifying the Effect of Prestressing Steel and Concrete Variables on the Transfer Length in Pretensioned Concrete Crossties (Project Extension),05/01/2011 - 12/31/2014, \$506,726, Co-PI,28%, \$141,883.28**
11. Hays Medical Center, Hays, KS, Improved In-Patient Floors Workflows for Nurses,01/01/2012 - 12/31/2012, \$18,000, Co-PI,50%, \$9,000.00
12. **Department of Transportation (DOT) Federal Railroad Administration (FRA), Quantifying the Effect of Prestressing Steel and Concrete Variables on the Transfer Length in Pretensioned Concrete Crossties,05/01/2011 - 10/31/2013, \$1,236,284, Co-PI, 28%, \$346,159.52**
13. Children’s Mercy Hospital, Kansas City MO, Improved In-Patient Discharging Processes,03/01/2010 - 07/01/2010, \$24,000, Co-PI,50%, \$12,000.00
14. University transportation Center (UTC) (\$61,308), Kansas Department of Transportation (KDOT) (\$35,351), Implementation of Non-Contact Strain Measurement Device for Bridges and Piers,01/01/2010 - 08/31/2010, \$96,659, Co-PI,33%, \$31,897.47
15. **U.S. Department of Veterans Affairs, VA Hospital in Kansas City, Model Patient Flow and Facility Design,01/01/2010 - 12/31/2010, \$60,000, Co-PI,50%, \$30,000.00**

16. Advanced Manufacturing Institute, Kansas State University, An "EKG" for Gear Manufacturing Diagnostics and Non-Contact Pre-Stressed Concrete Beam Strain Measurement,08/15/2004 - 08/21/2005, \$60,000, PI,50%, \$30,000.00
17. Kansas Department of Transportation KDOT, Non-Contact Diagnostics in Pre-Stressed Concrete Elements, 07/01/2004 - 06/30/2005, \$12,000, Co-PI,50%, \$6,000.00
18. Advanced Manufacturing Institute, Kansas State University, An "EKG" for Gear Manufacturing Diagnostics,07/15/2003 - 06/30/2004, \$42,000, PI, 50%, \$21,000.00
19. Advanced Manufacturing Institute, Kansas State University, Non-Contact Pre-Stressed Concrete Beam Strain Measurement,07/15/2003 - 06/30/2004, \$28,000, Co-PI,50%, \$14,000.00
20. Kansas Department of Transportation KDOT, Non-Contact Diagnostics in Pre-Stressed Concrete Elements,07/01/2003 - 06/30/2004, \$56,000, Co-PI,50%, \$28,000.00
21. Advanced Manufacturing Institute, Kansas State University, Non-Contact Pre-Stressed Concrete Beam Strain Measurement,07/01/2002 - 06/30/2003, \$40,445, PI,50%, \$20,222.50
22. Advanced Manufacturing Institute, Kansas State University, An "EKG" for Gear Manufacturing Diagnostics,07/01/2002 - 06/30/2003, \$55,315, Co-PI, 50%, \$27,657.50
23. Advanced Manufacturing Institute, Kansas State University, Non-Contact Inspection of Gear Profiles,07/01/2001 - 06/30/2002, \$65,935, PI,50%, \$32,967.50
24. Advanced Manufacturing Institute, Kansas State University, Non-Contact Inspection of Gear Profiles,07/01/2000 - 06/30/2001, \$56,635, PI, 50%, \$28,317.50
25. Advanced Manufacturing Institute, Kansas State University, Ultra Digital Imaging Compression Method using Wavelet Techniques, 07/01/2000 - 06/30/2001, \$10,280, PI,100%, \$10,280.00
26. Advanced Manufacturing Institute, Kansas State University, Optical Stylus – Non-contact Inspection of Surface Roughness,07/01/1999 - 06/30/2000, \$10,280, PI, 50%, \$5,140.00
27. Advanced Manufacturing Institute, Kansas State University, Computer Vision Inspection of Geometrical Profiles,07/01/1999 - 06/30/2000, \$26,935, PI, 100%, \$26,935.00
28. Advanced Manufacturing Institute, Kansas State University, Optical Stylus – Non-contact Inspection of Surface Roughness,07/01/1998 - 06/30/1999, \$11,810, PI, 50%, \$5,905.00
29. Kansas Technology Enterprise Corp (KTEC), State of Kansas, Online Non-Contact Inspection Of Gear Profiles,07/01/1998 - 06/30/1999, \$50,000, PI, 50%, \$25,000.00
30. Kansas Technology Enterprise Corp (KTEC), State of Kansas, Non-contact Evaluation of Nodularity in Casting Ductile Irons,07/01/1998 - 06/30/1999, \$50,000, PI, 100%, \$50,000.00
31. Advanced Manufacturing Institute, Kansas State University, Computer Vision Inspection of Geometrical Profiles,07/01/1998 - 06/30/1999, \$36,315, PI, 100%, \$36,315.00
32. Advanced Manufacturing Institute, Kansas State University, Wavelet Based Methods in Computer Vision and Image Analysis,08/01/1997 - 06/30/1998, \$12,662, PI, 100%, \$12,662.00
33. Advanced Manufacturing Institute, Kansas State University, Computer Vision Inspection of Feature-Based Designed Parts,08/01/1997 - 06/30/1999, \$23,617, PI, 100%, \$23,617.00
34. Advanced Manufacturing Institute, Kansas State University, Non-Contact Inspection Of Sand Casting Products,05/18/1997 - 05/17/1998, \$44,109, PI,100%, \$44,109.00
35. Advanced Manufacturing Institute, Kansas State University, Non-Contact Inspection of Gear Profiles,05/18/1997 - 05/17/1999, \$51,652, PI,50%, \$25,826.00

36. **National Science Foundation (NSF) EPSCoR/DMMI, Non-Contact Diagnostics in Manufacturing: A New Precision Measurement Laboratory,03/01/1998 - 05/31/1999, \$2,356,000, Co-PI, 25%, \$589,000.00**
37. Advanced Manufacturing Institute, Kansas State University, Non-Contact On-Line Surface Measurement Using OPTOSTYLUS,05/18/1996 - 05/17/1997, \$36,711, PI,100%, \$36,711.00
38. Advanced Manufacturing Institute, Kansas State University, Non-Contact Inspection of Geometrical Profiles,05/18/1996 - 05/17/1997, \$25,214, PI, 100%, \$25,214.00
39. Advanced Manufacturing Institute, Kansas State University, Strategic Outsourcing in a Distributed Manufacturing Environment,05/18/1996 - 05/17/1997, \$12,523, PI, 100%, \$12,523.00
40. Advanced Manufacturing Institute, Kansas State University, A New Wavelet based Image Compression/Decompression Technique,05/18/1995 - 05/17/1996, \$17,351, PI,100%, \$17,351.00
41. Advanced Manufacturing Institute, Kansas State University, Non-Contact Inspection of Geometrical Profiles,05/18/1995 - 05/17/1996, \$27,097, PI, 100%, \$27,097.00
42. Advanced Manufacturing Institute, Kansas State University, Dynamic Control of a Distributed Manufacturing Environment,05/18/1995 - 05/17/1996, \$25,005, PI,100%, \$25,005.00
43. Advanced Manufacturing Institute, Kansas State University, Computer Vision Inspection of Geometrical Profiles,05/18/1994 - 05/17/1995, \$103,066, PI,100%, \$103,066.00

Publication Highlights (Selected Publications listed)

Referred Journal Publications

** Graduate Student Co-Authors under my supervision are underlined.

1. Soltanolkottabi , Marzieh ; Ben-Arieh, David; Wu, Chih-Hang (John) "Modeling the Containment Behavior of Interacting Populations in Response to an Epidemic," Oct. 30, 2020, International Journal of Production Research (under review).
2. Yuyang Chen, Kaiming Bi, Chih-Hang (John) Wu, David Ben-Arieh "A Computational Scheme for Stochastic Optimal Control System with Variance Constraints" July 2, 2022 submitted to Computer and Industrial Engineering (under review).
3. Kaiming Bi, Yuyang Chen, Chih-Hang Wu, and David Ben-Arieh "A New Learning-Based Impulse Control with Event-Triggered Conditions for the Epidemic Dynamic System," (SMCA-20-06-1301) Vol. 108, May 10, 2022, Communications in Nonlinear Science and Numerical Simulation. DOI: <https://doi.org/10.1016/j.cnsns.2021.106204>
4. Beck, B. Terry; Peterman, Robert J.; Wu, Chih-Hang," Automated Optical Surface Strain Measurement System to Determine the Transfer Length in Pretensioned Concrete Railroad Ties," April 2021, Rural Railroad safety Center, Federal Railroad Administration, US Department of Transportation, DOI: <https://hdl.handle.net/2097/41314>
5. ML Arnold, RJ Peterman, BT Beck, CH Wu," Development of Un-Tensioned Pullout Tests to Determine the Bond Quality of Prestressing Reinforcements Used in Pretensioned Concrete Railroad Ties," April 2021, Rural Railroad safety Center, Federal Railroad Administration, US Department of Transportation, <https://hdl.handle.net/2097/41313>
6. Haynes, Mark; Wu, Chih-Hang; Beck, B. Terry; Peterman, Robert J. "Use of 3D Non-Contact Profilometry to Quantify Indent Characteristics of Prestressing Wires Used in Pretensioned Concrete Railroad Ties," February 2021, Rural Railroad safety Center, Federal Railroad Administration, US Department of Transportation, <https://hdl.handle.net/2097/41315>

7. Momeni, Amir F.; Peterman, Robert J.; Beck, B. Terry; Wu, Chih-Hang, "Effect of Concrete Properties and Prestressing Steel Reinforcement Type on the Development Length in Pretensioned Concrete Railroad ties," February 2021, Rural Railroad safety Center, Federal Railroad Administration, US Department of Transportation, <https://hdl.handle.net/2097/41301>
8. Holste, Joseph R.; Peterman, Robert J.; Beck, B. Terry; Wu, Chih-Hang, "Using Tensioned Pullout Tests to Determine the Bond-Slip Relationship and Splitting-Propensity of Reinforcements Used in Pretensioned Concrete Railroad Ties," February 2021, Rural Railroad safety Center, Federal Railroad Administration, US Department of Transportation, <https://hdl.handle.net/2097/41300>
9. Bodapati, Naga N.B.; Peterman, Robert J.; Beck, B. Terry; Wu, Chih-Hang, "A Comprehensive Study of Prestressing Steel and Concrete Variables Affecting Transfer Length in Pre-Tensioned Concrete Cross-ties," February 2021, Rural Railroad safety Center, Federal Railroad Administration, US Department of Transportation, <https://hdl.handle.net/2097/41267>
10. Kaiming Bi, Dong Lin, Yiliang Liao, Chih-Hang Wu, Pedram Parandoush "Additive Manufacturing Embraces Big Data," March 16, 2021, Progress in Additive Manufacturing, <http://link.springer.com/article/10.1007/s40964-021-00172-8>.
11. Marzieh Soltanolkotabi, David Ben-Arieh *, Chih-Hang Wu "Game Theoretic Modeling of Infectious Disease Transmission with Delayed Emergence of Symptoms," Special Issue: Non-Imitative Dynamics in Evolutionary Game Theory, 2020, 11(2), [DOI: doi:10.3390/g11020020](https://doi.org/10.3390/g11020020).
12. Kaiming Bi, Yuyang Chen, Songnian Zhao, Chih-Hang Wu, "A New Zoonotic Visceral Leishmaniasis Dynamic Transmission Model with Age-Structure," Chaos, Solitons and Fractals, Vol.133, April 2020, 109622, DOI: <https://doi.org/10.1016/j.chaos.2020.109622>.
13. Kaiming Bi, YuYang Chen, Chih-Hang-Hang J. Wu, David Ben-Arieh, "A Memetic Algorithm for Solving Optimal Control Problems of Zika Virus Epidemic with Equilibriums and Backward Bifurcation Analysis," Communications in Nonlinear Science and Numerical Simulation, 01/2020, DOI: <https://doi.org/10.1016/j.cnsns.2020.105176>
14. Beck, B.T., Peterman, R.J., Wu, Chih-Hang John, "The Uncertainty in Solutions to Implicit Equation Systems," Journal of Fluids Engineering, 01/2020, 142(1), <https://doi.org/10.1115/1.4044668>
15. Yuyang Chen, Kaiming Bi, Chih-Hang John Wu, David Ben-Arieh, "A New Evidence-Based Optimal Control in Healthcare Delivery: A Better Clinical Treatment Management for Septic Patients," Computers & Industrial Engineering, 08/2019, DOI: <https://doi.org/10.1016/j.cie.2019.106010>
16. Marzieh Soltanolkotabi, David Ben-Arieh, C-W Wu: "Spatial competitive games with disingenuously delayed positions," Journal of Dynamics & Games, 07/2019; <https://doi.org/10.3934/jdg.2019017>
17. Marzieh Soltanolkotabi, David Ben-Arieh, Chih-Hang Wu: Modeling Behavioral Response to Vaccination Using Public Goods Game. IEEE Transactions on Computational Social Systems, 03/2019; PP(99):1-9., DOI: <https://doi.org/10.1109/TCSS.2019.2896227>
18. Kaiming Bi, Yuyang Chen, Songnian Zhao, Yan Kuang, Chih-Hang John Wu: Current Visceral Leishmaniasis Research: A Research Review to Inspire Future Study. BioMed Research International, 07/2018; 2018(5):1-13., DOI: <https://doi.org/10.1155/2018/9872095>
19. Songnian Zhao, Yan Kuang, Chih-Hang Wu, Kaiming Bi, David Ben-Arieh: Risk Perception and Human Behaviors in Epidemics. IISE Transactions on Healthcare Systems Engineering, 04/2018; DOI: <https://doi.org/10.1080/24725579.2018.1464085>
20. Kaiming Bi, Yuyang Chen, Songnian Zhao, David Ben-Arieh, Chih-Hang (John) Wu: Modeling Learning and Forgetting Processes with the corresponding impacts on Human Behaviors in Infectious Disease Epidemics. Computers & Industrial Engineering, 04/2018; Vol. 129: 563-577 DOI: <https://doi.org/10.1016/j.cie.2018.04.035>

21. Yan Kuang, David Ben-Arieh, Songnian Zhao, Chih-Hang Wu: *Using spatial games to model and simulate tomato spotted wilt virus-western flowers thrips dynamic system*. International Journal of Modelling and Simulation 02/2018;, DOI:10.1080/02286203.2018.1442547
22. Yan Kuang, David Ben-Arieh, Chih-Hang Wu, Songnian Zhao: *Using spatial games to model dynamic evolutionary systems*. Mathematical and Computer Modelling of Dynamical Systems 02/2018; DOI:10.1080/13873954.2018.1437548
23. Amir F. Momeni, Robert J. Peterman, B. Terry Beck, Chih-Hang Wu, "A Prediction Model for Development Length of Indented Prestressing Wires," American Concrete Institute (ACI) Structural Journal; Volume 115, Issue 2, pp 525-534, March 2018.
24. Yuyang Chen, Kaiming Bi, Songnian Zhao, David Ben-Arieh, Chih-Hang John Wu, "Modeling individual fear factor with optimal control in a disease-dynamic system," Chaos Solitons & Fractals 11/2017; 104:531-545., DOI:10.1016/j.chaos.2017.09.001
25. Yan Kuang, David Ben-Arieh, Songnian Zhao, Chih-Hang Wu, David Margolies, James Nechols: *Mathematical Model for Two-Spotted Spider Mites System: Verification and Validation*. Open Journal of Modelling and Simulation 01/2017; 05(01):13-31., DOI:10.4236/ojmsi.2017.51002
26. Chih-Hang J. Wu, Zhenzhen Shi, David Ben-Arieh, Steven Q. Simpson: *Mathematical Modeling of Innate Immunity Responses of Sepsis: Modeling and Computational Studies: From Data to Knowledge to Healthcare Improvement*. Healthcare Analytics: From Data to Knowledge to Healthcare Improvement, 08/2016, pp.221-259.
27. Zhenzhen Shi, Stephen K. Chapes, David Ben-Arieh, Chih-Hang Wu: *An Agent-Based Model of a Hepatic Inflammatory Response to Salmonella: A Computational Study under a Large Set of Experimental Data*. PLoS ONE 08/2016; 11(8). DOI:10.1371/journal.pone.0161131
28. Zhenzhen Shi, David Ben-Arieh, Chih-Hang John Wu: *A preliminary study of sepsis progression in an animal model using agent-based modeling*. International Journal of Modelling and Simulation 04/2016; DOI:10.1080/02286203.2016.1172951
29. Songnian Zhao, Yan Kuang, Chih-Hang Wu, David Ben-Arieh, Marcelo Ramalho-Ortigao, Kaiming Bi (2016), *Zoonotic visceral leishmaniasis transmission: modeling, backward bifurcation, and optimal control*. Journal of Mathematical Biology, 73(6), 1525-1560; DOI:10.1007/s00285-016-0999-z
30. Zhenzhen Shi, Chih-Hang J. Wu, David Ben-Arieh, Steven Q. Simpson: *Mathematical Model of Innate and Adaptive Immunity of Sepsis: A Modeling and Simulation Study of Infectious Disease*. BioMed Research International Vol 2015 (2015), Article ID 504259, 31 pages, 04/2015. DOI:10.1155/2015/504259
31. Songnian Zhao, Chih-Hang J. Wu, David Ben-Arieh: *Modeling infection spread and behavioral change using spatial games*. Health System 11/2014; 4(1). DOI:10.1057/hs.2014.22
32. Chih-Hang J. Wu, Songnian Zhao, Yan Kuang, David Ben-Arieh, James Necholes, David Margolis: *New Mathematical Models for Vector-Borne Disease: Transmission of Tomato Spotted Wilt Virus*. Bridging Research and Good Practices towards Patients Welfare, 11/2014: pp. 259-268.
33. Zhenzhen Shi, Chih-Hang J. Wu, David Ben-Arieh, *Agent-Based Model: A Surging Tool to Simulate Infectious Diseases in the Immune System*. Open Journal of Modelling and Simulation 01/2014; 2(1). DOI:10.4236/ojmsi.2014.21004
34. Mark D Haynes, Levi DeLissa, Chih-Hang John Wu, Terry B Beck, Robert J Peterman: *Design of a Non-Contact Surface Profilometry System for Automated Geometrical Dimensioning and Tolerancing*. International Journal of Engineering Inventions, e-ISSN: 2278-7461, p-ISSN: 2319-6491, Volume 3, Issue 2 (September 2013) PP: 15-19.

35. Chih-Hang J. Wu, David Ben-Arieh, Zhenzhen Shi: *An Autonomous Multi-Agent Simulation Model for Acute Inflammatory Response*. *Investigations into Living Systems, Artificial Life, and Real-World Solutions*, 04/2013, pp.218-233
36. Matthew L Arnold, Robert J Peterman, B Terry Beck, John Wu: *Development of a Standard Bond Test for Indented Prestressing Wires*. *PCI Journal* 05/2013;
37. Weixin Zhao, Kyle Larsan, Robert J. Peterman, Terry Beck, and Chih-Hang J. Wu.: *Development of a laser-speckle imaging device to determine the transfer length in pretensioned concrete members*. *PCI Journal* 12/2012; 57(1) pp. 135-143. DOI:10.15554/pcij.01012012.135.143
38. Gitae Kim, Chih-Hang Wu: *A pegging algorithm for separable continuous nonlinear knapsack problems with box constraints*. *Engineering Optimization* 10/2012; 44(10). DOI:10.1080/0305215X.2011.646263
39. Gitae Kim, Chih-Hang Wu, Sungmook Lim, Jumi Kim: *Modified matrix splitting method for the support vector machine and its application to the credit classification of companies in Korea*. *Expert Systems with Applications* 08/2012; 39(10). DOI:10.1016/j.eswa.2012.02.007
40. Weixin Zhao, Chih-Hang J. Wu, Robert J. Peterman, Terry Beck, Pelle Doung: *Noncontact Inspection Method to Determine the Transfer Length in Pretensioned Concrete Railroad Ties*. *Journal of Engineering Mechanics* 04/2012; 139(3). DOI:10.1061/(ASCE)EM.1943-7889.0000449
41. Gitae Kim, Chih-Hang Wu: *Scenario aggregation for supply chain quantity-flexibility contract*. *International Journal of Systems Science* 11/2013; Vol.44 Issue 11 pp.2166-2182. DOI: <http://doi.org/10.1080/00207721.2012.702237>
42. Zhenzhen Shi, Chih-Hang J. Wu, David Ben-Arieh, *An Autonomous Multi-Agent Simulation Model for Acute Inflammatory Response*. *International Journal of Artificial Life Research* Volume 2 Issue 2, April 2011 pp. 105-121, 01/2011. DOI:10.4018/jalr.2011040106
43. Gitae Kim, Chih-Hang Wu, Yoon-Sung Jung: *A New ν SVM Model for Classification*. 10/2011. *Engineering Optimization*.
44. George Demiris, Neil Charness, Elizabeth Krupinski, David Ben-Arieh, Karla Washington, Chih-Hang J. Wu, Bonne Farberow: *The Role of Human Factors in Telehealth*. *Telemedicine and e-Health* 05/2010; 16(4). DOI:10.1089/tmj.2009.0114
45. David Ben-Arieh, D.-K. Gullipalli, Chih-Hang Wu: *DEA Analysis of Kansas Clinics with Sparse Data*. *Computers & Industrial Engineering*, Volume: 63, Issue: 1, pp. 13-21.
46. Chih-Hang J. Wu, Weixin. Zhao, Terry Beck, Robert Peterman: *Optical Sensor Developments for Measuring the Surface Strains in Prestressed Concrete Members*. *Strain*. 03/2009 (online); 06/2011 (printed), Vol. 47, Issue s1 DOI:10.1111/j.1475-1305.2009.00621.x, e376-e386
47. David Ben-Arieh, and Chih-Hang Wu: *Analogy-Based Multiple Process Planning System with Resource Conflicts*. *International Journal of Flexible Manufacturing Systems* 02/1999; 11(1). DOI:10.1023/A:1008044723365
48. Chih-Hang Wu, Jose A. Ventura, Sharon Browning: *Computational comparisons of dual conjugate gradient algorithms for strictly convex networks*. *Computers & Operations Research* 04/1998; 25(4-25), pp. 333-349. DOI:10.1016/S0305-0548(97)00056-7
49. Kun-Li Wen, Fan-Hsiung Chen, John C.H. Wu: *The selection of optimal project based on the grey relational grade*. 01/1998; 6(3).
50. ChiBin Cheng, Chih-Hang Wu: *Solving the FMS Part-Tool Grouping Problem Using Lagrangian Relaxation Approach*. 03/1997, *International Journal of Production Research*. 10(3) pp.209-231

51. Jen-Ming Chen, Jose A. Ventura, Chih-Hang Wu: *Segmentation of planar curves into circular arcs and line segments*. Image and Vision Computing 02/1996; 14(1-14), pp.71-83. DOI:10.1016/0262-8856(95)01042-4
52. Jincan Chen, Chih-Hang Wu: Finite-time thermodynamic analysis of a two-stage combined heat pump system. International Journal of Ambient Energy 10/1995; 16(4-4), pp.205-208.
53. Chung-Yaw Ching, Ching-Jong Liao, C. John Wu: *Scheduling a Bottleneck Facility for Two Production Lines*. Engineering Optimization 07/1994; Vol. 23(1-1), pp.45- 47.
54. S.T. Huang, K.C. Fan, John H. Wu: *A new minimum zone method for evaluating straightness errors*. Precision Engineering 07/1993; Vol. 15(3), pp. 158-165.
55. Kuang-Chao Fan, John H. Wu: *Parallel beam scanning system for flatness measurements of thin plates*. Proceedings of SPIE - The International Society for Optical Engineering 09/1993.
56. S.T. Huang, John H. Wu, K.C. Fan: A minimum zone method for evaluating flatness error of gage blocks measured by phase -shifting interferometry. Journal- Chinese Institute of Engineers 07/1993; 16(5-5) pp.641-650
57. .S.T. Huang, K.C. Fan, John C. Wu: *A new minimum zone method for evaluating straightness errors*. Precision Engineering 07/1993; 15(3):158-165.
58. S.T. Huang, John C. Wu, K.C. Fan: *A minimum zone method for evaluating flatness error of gage blocks measured by phase-shifting interferometry*. Journal of the Chinese Institute of Engineers 07/1993; 16(5-5):641-650.
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40. Weixin Zhao, B. Terry Beck, Robert J. Peterman, and John C.-H. Wu, "Development Of A 5-Camera Transfer Length Measurement System For Real-Time Monitoring Of Railroad Crosstie Production " Proceedings of the 2013 Joint Rail Conference, JRC2013-2468 April 15-18, 2013, Knoxville, Tennessee, USA. doi: 10.1115/JRC2013-2468.
 41. Weixin Zhao, B. Terry Beck, Robert J. Peterman, Robert Murphy, John C.-H. Wu, and Grace Lee, "A Direct Comparison Of The Traditional Method And A New Approach In Determining 220 Transfer Lengths In Prestressed Concrete Railroad Ties" Proceedings of the 2013 Joint Rail Conference, JRC2013-2469 April 15-18, 2013, Knoxville, Tennessee, USA. doi: 10.1115/JRC2013-2469.
 42. Mark Haynes, John C.-H. Wu, B. Terry Beck, Naga N.B. Bodapati, and Robert J. Peterman "Automated Real-Time Search and Analysis Algorithms for a Non-Contact 3D Profiling System " Proceedings of the 2013 SPIE Optical Metrology, May 13-16, 2013, Munich, Germany.
 43. Weixin Zhao, B. Terry Beck, Robert J. Peterman, John C.-H. Wu, Grace Lee, and Naga N.B. Bodapati, " Determining Transfer Length In Pre-Tensioned Concrete Railroad Ties: Is Anew Evaluation Method Needed?" Proceedings of the 2013 ASME Rail Transportation Division Fall Technical Conference, RTDF2013-4727 October 15-17, 2013, Altoona, Pennsylvania, USA.
 44. Joseph R. Holste, Robert J. Peterman, Naga, N.B. Bodapati, B.Terry Beck, and C.-H. John Wu, "Transfer Bond Test User to Predict Transfer Length of Concrete Railroad Ties" Proceedings of the 2013 ASME Rail Transportation Division Fall Technical Conference, RTDF2013-4726 October 15-17, 2013, Altoona, Pennsylvania, USA.
 45. Naga Bodapati, R.J. Peterman, W. Zhao, T. Beck, C.-H. Wu, J. Holste, M. Arnold, R. Benteman, R. Schweiger, "Transfer-Length Measurements On Concrete Railroad Ties Fabricated With 15 Different Prestressing Reinforcements" 2013 PCI Convention and National Bridge Conference, Sept. 21 – 24 , Gaylord Texan Resort in Grapevine, Texas.
 46. Mark Haynes, Chih-Hang John Wu, B. Terry Beck, and Robert J. Peterman, "3D Non-Contact Profilometry for Reinforcement Steel Quality Control", Proceedings of the 2013 Industrial and Systems Engineering Research Conference, May18-22, 2013, San Juan, Puerto Rico.
 47. Zhao W., Murphy, R.L., Peterman, R. J., Beck, T., Wu, C.-H. Wu, Duong, P. A Non-Contact Inspection Method to Determine the Transfer Length in Pre-tensioned Concrete Railroad Ties, ASCE, Journal of Engineering Mechanics, Special Issue, "Experimental Methods in Damage Detection and Wind Engineering." doi: 10.1061/(ASCE)EM.1943-7889.0000449 ([http://dx.doi.org/10.1061/\(ASCE\)EM.1943-7889.0000449](http://dx.doi.org/10.1061/(ASCE)EM.1943-7889.0000449)).
 48. Kim, G. and Wu, C. (2012). Scenario aggregation for Supply Chain Quantity-Flexibility Contract, International Journal of Systems Science, 43(1) 1-17 online publication same time. doi: 10.1080/00207721.2012.702237 (<http://www.tandfonline.com/doi/pdf/10.1080/00207721.2012.702237>)
 49. Kim, G., Wu, C., Lim, S., & Kim, J. (2012). Modified matrix splitting method for the support vector machine and its application to the credit classification of companies in Korea. Expert Systems with Applications, 39(10), 8824-8834.
 50. Zhao,W., Beck, T., Peterman, R.J., Wu, C.-H. (2012) A Portable Modular Optical Sensor Capable of Measuring Complex Multi-Axis Strain Fields, SPIE – Optics & Photonics, 2012, San Diego, CA.
 51. Haynes,M., Wu, C.-H., Beck, T., Peterman, R.J., (2012) Non-Contact Measurement of Wire Indent Profiles on Prestressed Reinforcement Steel, AREMA 2012 Annual Conference and Exposition. Sept. 16-19, 2012 Chicago, IL.
 52. Zhao, W., Beck, T., Peterman, R.J., Wu, C.H., Murphy, R.L., Bloomfield, J., Lee, G. An Automated Transfer Length Measurement System for use on Concrete Railroad Ties, The 2012 PCI Convention and National Bridge Conference, September 29 - October 3, 2012.
 53. "Modeling and Simulation of Sepsis: Explore the Therapeutic Agents in Intensive Care Unit", INFORMS Conference 2011, Phoenix, Arizona., Oct. 2012.
 54. "A Stochastic Model for Epidemics Using Spatial Games", INFORMS Conference 2011, Phoenix, Arizona., Oct. 2012.
 55. American Association of Telemedicine, "Human Factors: Streamlining Telehealth Processes for Success. *Human Factors and Technology Implications*", Human Factors Special Interest Group, April 29-May 1 2012, San Jose, CA.

56. Non-Contact Measurement of Wire Indent Profiles on Prestressed Reinforcement Steel, AREMA 2012 Annual Conference and Exposition. Sept. 16-19, 2012 Chicago, IL.
57. Kansas Hospital Association, "Healthcare System Center at Kansas State University", Nov. 1, 2012, Wichita, KS.
58. An Automated Transfer Length Measurement System for use on Concrete Railroad Ties, The 2012 PCI Convention and National Bridge Conference, September 29 - October 3, 2012.
59. "Dealing with Supplier Selections Issues in the Supply Chain Environment", IERC conference 2011, Reno, Nevada., May 2011.
60. American Association of Telemedicine, "Human Factors: Streamlining Telehealth Processes for Success. *Human Factors and Technology Implications*", Human Factors Special Interest Group, May 1 2011, Tempa, FL.
61. Kansas Hospital Association, "Healthcare System Center at Kansas State University", Nov. 1, 2011, Wichita, KS.
62. "Supplier Selection using Semi-supervised learning theory ", 2009 DSI annual conference, San Diego , CA, November 2010.
63. "Solving SVM Classification Problem using Gradient Projection and Incomplete Cholesky Decomposition ", 2010 INFORMS Annual Meeting, Austin, TX, October 2010.
64. "A Simulation Study or Patient Flow Improvement Modes ", 2010 SHS Annual Meeting, Atlanta, GA, February 2010.
65. "A Predictive Agent-based Model of Acute Inflammatory Response", 2010 SHS Annual Meeting, Atlanta, GA, February 2010.
66. " Solving Support Vector Classification problem using Augmented Lagrangian method and Incomplete Cholesky Decomposition ", IERC conference 2010, Cancún, Mexico., June 2010.
67. "Modeling and Analysis of Acute Inflammatory Response", IERC conference 2010, Cancún, Mexico., June 2010.
68. "A predictive tool for H1N1s progression in the tissue level", IERC conference 2010 Poster Presentation, Cancún, Mexico., June 2010.
69. "DEA Analysis of Kansas Clinics with Sparse Data", IERC conference 2010, Cancún, Mexico., June 2010.
70. American Association of Telemedicine, "Setting the Record Straight: Human Factors and Electronic Health Records. *Human Factors and Technology Implications*", Human Factors Special Interest Group, April 5 2010, Seattle, WA.
71. Kansas Hospital Association, "Healthcare System Center at Kansas State University", Nov. 1, 2009, Wichita, KS.

Graduate Students Supervised:

Post-Doctoral Researcher:

Weixin Zhao (2011 -- 2014)

Chair or Co-Chair of Ph.D. Committee

1. Manoj Chopra (PhD IE, Graduated 1998) Vice President - Strategic Pricing, Essilor, Dallas, TX
2. Amarnath Poola (PhD IE, Graduated 1999) Chairman at PRA Educational Foundation, India
3. Umash Arasu (PhD IE, Graduated 2000) Vice President of R&D at o9 Solutions, Dallas, TX
4. Girish Nahate (PhD IE, Graduated 2006) Senior Strategic Marketing Analyst at FedEx Services, Memphis, TN.
5. Gitae Kim (PhD IE, Graduated 2012) Assistant Professor at Hanbat National University, Deajeon, Korea
6. Weixin Zhao (PhD MNE, Graduated 2011)
7. Mark Haynes (PhD IE, Graduated 2015) Dimensioning & Tolerancing Engineer III at Spirit AeroSystems, Wichita, KS.
8. Zhenzhen Shi (PhD IE, Graduated 2015) Post-Doc at Rollins School of Public Health, Emory University, Atlanta, GA

9. Songnian Zhao (PhD IE, Passed Prelim, Graduated 2016) Senior Strategic Marketing Analyst at FedEx Services, Memphis, TN.
10. Yan Kuang (PhD IE, Passed Prelim, Graduated 2016) Senior Strategic Marketing Analyst at FedEx Services, Memphis, TN.
11. Aaron Robertson (PhD MNE, Graduating Spring 2021)
12. Kaiming Bi (PhD IE, Post-Doc Researcher, University of California - San Diego)
13. YuYang Chen (PhD IE, Graduating Summer 2021)

Master of Science (More than 100 graduated only list selected below)

1. Richard Weihe Zhu (MSIE 1995) President at Apollo Future Technology, Livermore, CA
2. Jeevan Mulgund (MSIE, 1996) Vice President, Kennametal, Saratoga, CA
3. Bo Li (MSIE, 1998) Principal Software Engineer at Arris/CommScope, San Francisco Bay Area
4. Ye Haiwei (MSIE 1998) Technical Archtect at AT&T, St. Louis, MO
5. Toby Marks (MSIE, 1999) Portfolio Reserach Consultant at American Century Investments
6. Madhavan Ramanujam (MSIE, 1999) Partner and Board Member at Simon-Kucher & Partners
7. Rhishi Pethe (MSIE, 1999) Product Manager, Mineral, X, the moonshot factory, San Francisco Bay Area, CA
8. Bhavesh Shah (MSIE, 2003) Vice President, Data Management Strategy, Kinecta Federal Credit Union, Manhattan Beach, CA
9. Anup Aravind (IMSIE, 2003) Senior Manager, PWC, Baltimore, Maryland
10. Sanket Sanghavi (MSIE, 2006) Sr. Principal Operations Research Consultant at Manhattan Associates
11. Sara DeHaven (MSIE, 2007) Senior Manager at Accenture, Kansas City, MO
12. Mark Neier (MSOR, 2009) Manager at Deloitte
13. Brad Fouse (MSOR, 2009) Director of Chassis – Intermodal Rail Operation at JB Hunt, Fayetteville, AK
14. Balaji Lolla (MSIE, 2011) Senior Analyst, Data Science at Petco
15. Anand Ramani (MSIE, 2011) Sr Product Manager at Amazon
16. Robert Richards (MSIE, 2012) Performance Improvement Consultant at Children's Mercy Hospital, Overland Park, KS
17. Jordan Bever (MSOR, 2013) Strategy and Operations Consultant at Deloitte
18. Christopher Maldonado-Martinez (MSIE, 2014) Manager at Grant Thornton LLP, Deltona, FL
19. Adam Robl (MSOR, 2015) Senior Supply Chain Optimization Manager at Walmart

Services & Professional Involvements:

- IT manager for IMSE Department, College of Engineering, 1995 – 2013.
- IT manager for IMSE Department, College of Engineering, 2015 – present.
- IT manager for Advanced Manufacturing Institute, 2015 – present.
- Co-Director of Non-Contact Precision Measurement (NCPM) Lab, Kansas State University 1996 -- present
- Co-Director of University Healthcare Operation Resource (HCOR) Center, Kansas State University, 2009 – present

Reviewer Services:

- IISE Transaction
- Operations Research

- Journal of Mathematical Biology
- Mathematical Program Series B
- Transportation Science
- Entropy
- International Journal of Modelling and Simulation
- Journal of Engineering Mechanics
- Precision Engineering
- International Journal of Artificial Life Research
- European Journal of Operations Research
- Journal of Manufacturing Systems
- SIAM Journal on Optimization Journal of Healthcare Engineering
- Journal of Computation
- Mathematical Biosciences and Engineering
- Structures
- Asian Journal of Research in Infectious Diseases
- IEEE Transactions on Computational Social Systems
- Journal: Journal of Epidemiology and Global Health
- Journal of Advances in Mathematics and Computer Science
- Annals of Clinical and Medical Microbiology
- Journal of Scientific Research and Reports
- Journal of Geography, Environment and Earth Science International
- Research and Reviews of Infectious Diseases
- Revista Brasileira de Farmacognosia
- International Journal of Industrial Engineering: Theory, Applications and Practice
- Archives of Current Research International
- African Journal of Mathematics and Computer Science Research
- American Journal of Operations Research

Skills & Activities

Skills Production Engineering, Logistics, Production Planning, Production, Prestressed Concrete, Concrete, Classification, Optical Sensors, Support Vector Machine, Measurement, Algorithms, Innate Immunity, Adaptive Immunity, Cellular Immunology, Sepsis, Anti-Inflammatory, Segmentation, Inflammation, Macrophage, Immunology of Infectious Diseases, Cytokine Biology, Geometric Dimensioning & Tolerancing, Reinforced Concrete, Strain Analysis, Infectious Diseases, Evolutionary Game Theory, Bifurcation Analysis, Linear Stability Analysis, Simulation Modeling, Agent-Based Simulation, Modeling, Compressive Strength, Supply Chain, Rails, Optimization, Nonlinear Optimization, Simulators, Modeling and Simulation, Sensor Development, Industrial Engineering, Concrete Technologies, Laser Diagnostics in Flows and Combustion, Inflammatory Biomarkers, Financial Risk Management, Financial Engineering, Papers, Mathematical Models, Images, Image Processing, Septic Shock

*Scientific
Memberships*

- The Institute for Operations Research and the Management Sciences (INFORMS),
- IEEE Computers Society,
- Institute of Industrial and System Engineers (IISE),
- Mathematical Programming,
- Society of Industrial and Applied Mathematics (SIAM),
- Society of Healthcare Systems (SHS),
- American Telemedicine Association (ATA)

Professional Society Services:

- Conference Session Chairs for INFORMS, ISERC, SIAM on Optimization, ATA, Society of Health Systems.
- Workshops for ATA Annual Conferences for 3 years on Process Improvements, Lean and Six Sigma, Ergonomics.
- Workshop for Kansas Hospital Association.
- Participate in Tradeshow for Annual Conferences for Kansas Hospital Association to promote the HCOR center and Kansas State University efforts on out reaching,
- Various training workshops for hospitals and healthcare professionals around Kansas.
- Panel Review for NSF, US DOT, NIH proposals
- Advise 30 undergraduate students every semester
- Advise average 10 graduate students every year for the past 23 years
- Departmental committee: Equipment, Ice Professorship Search, Faculty Search, Undergraduate Curriculum
- College committee: Diversity Committee, Honor and Award committee, University Honors Program committee
- University committee: Information Resource Management Council

Service Efforts to the University HealthCare Operation Resource (HCOR) Center

Health-Care Resource Center Activities at the IMSE department

❖ **Information Systems:**

- Develop an interface between the Emergency Department (ED) and an existing Electronic Medical Record (EMR) at a medium size hub hospital. This project developed a web based EMR that linked the ED with the existing system, adding a patient safety monitoring system implemented at a 75-bed rural hospital.

❖ **Facility Planning:**

- Provide layout design and analysis for a Critical Access Hospital. In this project we designed a new layout for a small hospital that needed to expand and develop an educational facility. We proposed three alternative designs that the hospital will consider for implementation and for future expansion.

❖ **Workflow Improvement / Facility Planning:**

- Layout design and process improvement in a pharmacy at a military hospital.

❖ **Workflow Improvement :**

- Process improvement in a medical screening facility. This project developed an improved schedule and process that increases the flow of patients at the medical screening facility.
- In this project we improved the patient flow between the ED, the ICU units and in-patient departments at a large urban medical center. The project resulted in a better design of the Emergency Department with an improved process.
- Analyze and plan the ED Physicians workload. This project analyzes the work load on the ED physicians, the “interruption” schedule as well as the time spent at the various activity centers, and distance travelled. Issues such as communication with nurses, imaging and labs are also analyzed and an improved process and layout is proposed.

❖ **Project Management / Information Systems.**

- Project sorting and prioritizing in a large IT department in an urban hospital system. In this project we developed an information system as well as algorithms that analyze the projects relative importance and resource requirements and present the decision makers

with a prioritized list of projects. The system is very flexible allowing modifying the criteria as well as their weights for sorting the projects.

❖ **Staff Scheduling:**

- Scheduling surgeries in a for-profit ambulatory surgery facility. In this project we reduced the variability of the surgeries and developed an improved schedule in order to reduce the patients waiting time and surgery delays.

❖ **Workflow Improvement / Information System:**

- Process improvement at a Pre-Admission office. Two hospitals needed to improve the surgery scheduling as well as diagnostics and pre-surgery testing operation. We developed improved processes at both hospitals with an accompanying information system that improves the communication between the clinics and the office as well as among the various functions in the office.

❖ **Logistics / Optimization**

- Optimized inventory ordering procedure for medical supplies. In this project we defined the optimal ordering size as well as safety stock for a perishable medical item such as oxygen tanks. The project developed an optimal solution and a software tool to be used by the hospital that helped decide when and how many items to order in an effort to reduce cost.

❖ **Improved Bed Management.**

- This project looks at the process of releasing and acquiring inpatient beds. The project develops a standardized and improved process that utilizes the software available at the hospital.

Grants Generated (Total \$777,067)

Spring 2008:

1. \$1,000 for Layout project at Ellsworth Critical Access Hospital.
2. \$2,500 for IT Project Management system for Alegent Health.
3. \$2,500 for Process Improvement at the Pre-Admission in Immanuel Hospital.
4. \$3,000 for Process Improvement at the Pre-Admission in Hays Medical Center.

Total for Spring 2008: \$9000

Fall 2008:

1. \$5,000 Improves logistics operations for Associated Purchasing Systems.
2. \$9,500 Improved patient flow in KU Medical Center.
3. \$3,000 Improved Pre-Admission process at Hays Medical System – tools installation.

Spring 2009:

1. Measuring and analyzing efficiency of safety net clinics, Center for Engagement and Community Development, \$18,500

Fall 2009:

1. \$5,000 Improves logistics operations for Associated Purchasing Systems.
2. \$60,000, Engineering Flow Model, VA Medical Center K.C, (for 12 months).

Spring 2010:

1. \$23,680 Improved Deployment of the Tele-Tracking BedBoard Monitoring System, Children Mercy Hospital, KC.

Fall 2010:

1. \$5,000; Process Improvement workshop at the Mercy Regional Health Center, Manhattan.

Spring 2011:

1. \$5,000; Process Improvement workshop at the Neosho Regional Medical Center Chanute, KS.
2. \$30,000, Engineering Flow Model, VA Medical Center K.C, (for 6 months).

Fall 2011 – Spring 2012

- Children Mercy Hospital K.C. – improving Pediatrics Clinic operations (Broadway clinic location - continuation). Budget \$26,820.
- Hays Medical Center- improving Surgical and Medical Inpatient wards continuation). (budget \$18,803)
- U.S. Department of Veterans Affairs: Operating Room IT Evaluation (Rys, M. PI, Ben-Arieh D., Co-PI), \$63,882, 10/01/2011 – 11/1/2012.
- U.S. Department of Veterans Affairs: Measuring Impact of Field Based Analytics Education (Chang, S., Douglas-Mankin K., and Ben-Arieh D.), \$62,282, 11/01/2011 – 07/31/2012.
- U.S. Department of Veterans Affairs: Readiness for Reliability in Sterile Processing Department, (Chang, S., Douglas-Mankin K., and Ben-Arieh D.), \$61,698, 11/01/2011 – 07/12/2012.
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Spring 2013

- Mercy Regional Manhattan: Streamlining supplies flow to the ED, Sept. 2012 – to May 2013, \$7,477.

- Creating Distance Learning Lean Training Exercises, \$65,398 (Co-PI with Dr. Chang, and Dr. Dougl-Mankin as PI), 9/12/2012 to 6/30/2013 US Department of Veterans Affairs (VERC)
- Children Mercy Hospital “Predictive Scheduling Mode” Jan 2013 to Dec. 2013, for \$46,472. Project dealing with scheduling OR and PICU to minimize cancelled surgeries.
- Via Christi, “modeling core processes at mercy regional Manhattan” Jan 2013 to Dec. 2013, \$96,017.

Fall 2013

- VERC and New Mexico VA, “telemental health appointment optimization, \$57,307 from Sept. 2013 to June 2014, Ben-Arieh D. PI.
- VERC and VA system, “Enhancing our virtual learning environment, \$68,577, Sept. 2013 to June 2014, Chang S., Rys, M, and Ben-Arieh D.

Total generated in 2013: \$ 268,373.

Fall 2014:

- ED process improvement, Via Christie
- Medical Building layout and support, Via Christie

Workshops and Seminar Hosted by the Center:

1. March 5, 2008: Chris Tilden, Director, Office of Local and Rural Health, KDHE. This organization provides leadership and coordination to the many Critical Access Hospitals in Kansas, as well as rural clinics and mid-size hospitals.
2. April 16, 2008: Frank Dexter, MD, Ph.D., Director, Division of Management Consulting, Departments of Anesthesia and Health Management & Policy, Univ. of Iowa. Dr. Dexter, an expert on operating room scheduling, gave a seminar titled “IE in Healthcare: Lessons from Studies of Reducing Setup and Cleanup Times in Operating Rooms”.
3. May 8, 2008: Larry Pitman, president and CEO of Kansas Foundation for Medical Care (KFMC). This organization carries the responsibility to develop quality standards, and certify providers based on CMS (Center for Medicare and Medicaid Services) requirements. KFMC is a central organization in Kansas closely collaborating with the Kansas Health Policy Authority.
4. Scott Chapman, CEO of Manhattan Surgical Center “a For Profit Healthcare Entity”
5. Dr. Cox, Medical Director, Hays Medical Center "Past, Present and Future of Tele-Health."
6. Bob Meling, CEO of Associate Purchasing Services, "IE Experiences in Healthcare."
7. Connie Satzler CEO of EnVisage LLP, "Career in Non-Profit Healthcare Industry."
8. Dr. Steven Simpson, MD. KU Med University Hospital, "Sepsis Management in ICU (Mini-Curriculum)."
9. Douglas Peterson, ICU Manager of KU Med University Hospital, "Rapid Response Team Impacts on Saving Lives" (Mini-Curriculum).
10. Dr. Zilla Sinuany-Stern, “Hospitals' Efficiency by Size and Type of Ownership”, Oct. 3, 2008.

Presentations and Displays

1. Ben-Arieh D., and Wu, J., Kansas Hospital Association Conference, October 2007, Wichita, KS.

2. Ben-Arieh D., and Wu, J., Society of Health Systems, "Improved Scheduling in a For-Profit Surgical Center" Feb, 22, 2008, Orlando, FL.
3. Ben-Arieh D., and Wu, J., American Association of Telemedicine, "Incorporating IE concepts into Telemedicine", Human Factors Special Interest Group, April 5 2008, Seattle, WA.
4. Ben-Arieh D., and Wu, J., State Network Council Meeting, "The health systems resource center: potential contributions", July 29 2008, Wichita, KS.
5. Ben-Arieh D., and Wu, J., Kansas Hospital Association Conference, November 2008, Kansas City, KS.
6. Ben-Arieh D., and Wu, J., Society of Health Systems, moderating the "Patient Flow" tracks, April 1-4, 2009, Chicago, IL.
7. Ben-Arieh D., and Wu, J., "Incorporating IE concepts into Telemedicine", Human Factors Special Interest Group, American Telemedicine Association Conference, April 26-28 2009, Las Vegas, NV.
8. Ben-Arieh D., and Wu, J., Kansas Hospital Association Conference, Nov. 13 -14, 2009, Wichita, KS.
9. Ben-Arieh D., and Wu, J., Society of Health Systems Conference, "Simulation Study of Patient Flow Improvement Models", Atlanta, GA,. Feb. 25-28, 2010.
10. Ben-Arieh D, and Wu, J., Lean Operations in Hospitals, Workshop held in Kansas State University, April 30, 2010.
11. Ben-Arieh D., and Wu, J., invited short course: Setting the Record Straight: Human Factors and Electronic Health Records (EHRs), American Telemedicine Association, 15th Annual Meeting, San Antonio, TX, May 16, 2010.
12. Ben-Arieh D., and Wu, J., American Thoracic Society: Poster presentation, New Orleans, May 19, 2010.
13. Ben-Arieh, D., Wu, J. and Gullipalli D-K, DEA analysis of Kansas clinics with sparse data, Industrial Engineering Research Conference, June 5-9, 2010, Cancun, Mexico.
14. Ben-Arieh, D., Wu, J. and Shi Z., Modeling and Analysis of Acute Inflammatory Response, Industrial Engineering Research Conference, June 5-9, 2010, Cancun, Mexico.
15. Ben-Arieh, D., Wu, J. and Shi Z., A predictive tool for H1N1s progression in the tissue level, Industrial Engineering Research Conference Poster presentation, June 5-9, 2010, Cancun, Mexico.
16. Ben-Arieh, D., Wu, J., Introduction to Lean Operations, ASHE Region 8 Fall Convention, Overland Park, Kansas, Oct. 8, 2010.
17. Ben-Arieh D. and Wu, J., Process Improvement Workshop for Leadership Circle, Dec. 8, 2010. Invited by Mercy Regional Medical Center, Manhattan, KS.
18. Ben-Arieh D., and Wu, J., Society of Health Systems Conference, "Managing the Load on Emergency Room Physicians", Orlando, FL,. Feb. 17-19, 2011.
19. Wu, J., Ben-Arieh D., and Zhezhen Shi, "Modeling the Evolution of Sepsis using Agent Based Approach", invited presentations, University of Kansas Medical Center, March 1, 2011.
20. ATA conference, short course "Human Factors: Evaluating Business Performance and Streamlining Telehealth Processes for Success", Tampa FL, May 1-3, 2011.
21. Ben-Arieh, D., and Gullipalli D., Data Envelopment Analysis of Clinics with Sparse Data: Fuzzy Clustering Approach, Industrial Engineering Research Conference, May 21-25, 2011, Reno, NV.
22. Ben-Arieh, D., Wu, J., Human Factors: Streamlining Telehealth Processes for Success, American Telemedicine Association Convention, Tampa FL, May 1-3, 2011 (with Sossong S., and Boissy P.)
23. Shi, Z., Wu, J., Ben-Arieh, D., "Modeling and Simulation of Sepsis: explore the therapeutic agents in intensive care unit", INFORMS, Phoenix AZ, Oct. 14 - 17, 2012.

24. Shi, Z., Wu, J., Ben-Arieh, D., "Acute inflammatory response and perturbation analysis of pro-inflammatory and anti-inflammatory cytokines", IERC, Orlando, FL, May 19, 2012, IIE Doctoral Colloquium, Poster Presentation.
25. Webinar The Role of Human Factors in Telemedicine – Presented the Chapter on Standards and Metrics – Feb. 29, 2012, Organized by the ATA.
26. Ben-Arieh, D., Human Factors in Telehealth: An Introduction, American Telemedicine Association Convention, San Jose, CA, April 29 – May 1, 2012 (with Boissy P., and Charnes N.).
27. Ben-Arieh, D., Modeling and Analysis of Telemedicine Processes: Plan for Success, American Telemedicine Association Convention, San Jose, CA, April 29 – May 3, 2012.
28. Ben-Arieh D., and Wu, J., Kansas Hospital Association Conference, November 14-15 2013, Wichita, KS.
29. Ben-Arieh D., and Leistner G., Understanding and Modeling Telemedicine Business Processes, half-day course, ATA Convention, May 4-7, 2013 Austin. TX.
30. Ben-Arieh, D., and Wu C-H, Organizational Culture and Strategic Process Improvement, Poster, SHS conference Feb. 28 - March 3, 2013, New Orleans.
31. Ben-Arieh D. and Wu C-H, Minimizing nurses walking distance using zoning, ICPR 22, Iguassu Fall, Brazil, July 28 – August 1, 2013.
32. Wu C-H, Zhao S., and Ben-Arieh D., Using Spatial Games to model Human Mobility and Spread of Epidemics, ISERC, San Juan, Puerto Rico, May 18 -22, 2013.
33. Shi Z., Wu C-H, Ben-Arieh D., Zhao S., Chapes S., and Simpson S., Mathematical model and agent-based model: a comparative study on the performance of sepsis, *Informatics* 2013, Minneapolis, MN, Oct. 6 - 9, 2013.
34. Zhao S., Ben-Arieh D., and Wu Chih-Hang, Impacts of Information Transmission and Human behaviors in Epidemics: A Spatial Game Model, annual INFORMS conference, Oct. 6 - Oct. 9, 2013, Minneapolis, MN:
35. Chih-Hang Wu, Zhenzhen Shi, David Ben-Arieh, Stephen Q. Simpson, Mathematical modeling of innate immunity of sepsis progression: a modeling and simulation study, Book Chapter of *Healthcare Data Analytics*, John Wiley & Sons, published in Nov., 2014.
36. Chih-Hang John Wu, David Ben-Arieh and Zhenzhen Shi. "An Autonomous Multi-Agent Simulation Model for Acute Inflammatory Response." In *Investigations into Living Systems, Artificial Life, and Real-World Solutions*, ed. George D. Magoulas, 218-233 (2013), accessed February 06, 2015. doi:10.4018/978-1-4666-3890-7.ch018.
37. Zhenzhen Shi, Chih-Hang Wu, David Ben-Arieh, "Agent-based model: a surging tool to simulate infectious disease in the immune system," *Open Journal of Modeling and Simulation* 2014, 2: 12-22.
38. Songnian Zhao, Chih-Hang (John) Wu, David Ben-Arieh, "Modeling Infection Spread and Behavioral Change Using Spatial Games". *Health Systems advance online publication* (2014), doi: 10.1057/hs.2014.22
39. Chih-Hang(John) Wu, Songnian Zhao, Yan Kuang, David Ben-Arieh, David Margolies, and James Nechols (2014) " New Mathematical Models for Vector-Borne Disease: Transmission of Tomato Spotted Wilt Virus," *Bridging Research and Good Practices towards Patient Welfare*, CRC Press, an imprint of Taylor and Francis Group. pp.. 259 – 268.

40. Songnian Zhao, Chih-Hang (John) Wu, David Ben-Arieh, Yan Kuang, David Margolies, and James Nechols, "Analysis of Vector-borne Disease Model with Time Delay and Age Structures", Proceedings of the IIE Annual Conference and Expo 2014 – Montreal, Canada, May 31 – June 3.
41. David Ben-Arieh, Chih-Hang Wu, Andrew Waldman, Levi Delissa, Johnathan Weiss, "Optimizing Surgery Schedule with PICU Nursing Constraints," Proceedings of the IIE Annual Conference and Expo 2014 – Montreal, Canada, May 31 – June 3.
42. Yan Kuang, Chih-Hang(John) Wu, David Ben-Arieh, Songnian Zhao, David Margolies, and James Nechols, "Mathematical Models for Two-spotted Spider Mites and Phytoseiulus Persimilis", Proceedings of the IIE Annual Conference and Expo 2014 – Montreal, Canada, May 31 – June 3.
43. Zhenzhen Shi, Chih-Hang Wu, David Ben-Arieh, "Modeling Comparative Study on Sepsis, Proceedings of the IIE Annual Conference and Expo 2014 – Montreal, Canada, May 31 – June 3.

Invited Scholars

1. Prof. Zilla Sinuany-Stern, Ben-Gurion University, Sept. 2 2008 - Dec. 2, 2008.
2. Dr. Meiqing Wang, visiting scholar, Dept. of Industrial Eng., Beijing Aerospace Institute.

Current Advisory Board Members:

1. Bob Copple, Ancillary Services Executive, Immanuel Medical Center, Omaha, Nebraska.
2. Bob Cox, MD, Medical Director, Hays Medical Center, Hays, Kansas.
3. Chris Deck, Therapy Director, Via Christi – HOPE, Wichita.
4. Kathy Gooch, MD, Coffeyville Doctor's Clinic, Coffeyville, Kansas.
5. Beth Kalberg, Senior Director, Ambulatory Services, Children's Mercy Hospitals and Clinics
6. Amy Martens, P.E. Management Engineer, Blue Cross and Blue Shield of Kansas, Topeka.
7. Doug Miller, Manager, Informatics Field Support, Premier, Inc., Charlotte, NC .
8. Doug Peterson , Nurse Manager, The University of Kansas Hospital, Kansas City, Kansas.
9. Rosanne Rutkowski , Director Kansas Trauma Program, Kansas Department of Health and Environment
10. Cindy Samuelson, Vice President Member Services and Public Relations, Kansas Hospital Association, Topeka, Kansas.
11. Connie Satzler, President, EnVisage, Manhattan, Kansas.
12. Terry Siek, Chief Nursing Officer, Hays Medical Center Hays, Kansas.
13. Steve Simpson, Associate Professor of Medicine, Pulmonary and Critical Care Medicine, The University of Kansas Hospital, Kansas City, Kansas.

List of Projects + Students

2010:

- VA Hospital in KC. MO. Patient flow improvement in the ED. (completed December 2010). (3 students)
- VA Hospital in KC. MO. Design of the Central Intake facility and operation (completed May 2011). (3 students)
- Children Mercy, KC, Bed Management and teletracking (completed May 2011). (2 students).
- University of Kansas, Ed physicians project (completed May 2011) 3 students.
- Via Christie Wichita, Falls project – 1 Ph.D.

- University of Kansas Sepsis project – 2 PhDs.

2011:

- VA Hospital in KC. MO. Design of the Central Intake facility and operation (completed May 2011).
- Children Mercy Hospital K.C. – improving bed utilization using Tletracking. (\$23,600)
- Children Mercy Hospital K.C. – improving Pediatrics Clinic operations (Broadway clinic location).
- University of Kansas Medical Center – improving ED physicians productivity.
- Hays Medical Center- improving Surgical and Medical Inpatient wards (\$18,803).

2012:

- Children Mercy Hospital K.C. – improving Pediatrics Clinic operations (Broadway clinic location - continuation). Budget \$26,820.
- Hays Medical Center- improving Surgical and Medical Inpatient wards continuation). (budget \$18,803)
- U.S. Department of Veterans Affairs: Operating Room IT Evaluation (Rys, M. PI, Ben-Arieh D., Co-PI), \$63,882, 10/01/2011 – 11/1/2012.
- U.S. Department of Veterans Affairs: Measuring Impact of Field Based Analytics Education (Chang, S., Douglas-Mankin K., and Ben-Arieh D.), \$62,282, 11/01/2011 – 07/31/2012.
- U.S. Department of Veterans Affairs: Readiness for Reliability in Sterile Processing Department, (Chang, S., Douglas-Mankin K., and Ben-Arieh D.), \$61,698, 11/01/2011 – 07/12/2012.

2013:

- U.S. Department of Veterans Affairs: Creating Distance Learning Lean Training Exercises (Co-PI with Dr. Chang, and Dr. Douglas-Mankin as PI).
- Children Mercy Hospital K.C. – Scheduling Radiology Operations
- Children Mercy Hospital KC: Scheduling and staffing PICU operations (\$46,472)
- Mercy Regional Manhattan: Streamlining supplies flow to the ED (\$5,000)
- Via Christi, “modeling core processes at mercy regional manhattan” (\$96,017)
- VERC and New Mexico VA, “telemental health appointment optimization. (\$57,307)
- VERC and VA system, “Enhancing our virtual learning environment” (with Chang S., Rys, M)

2014

- Via Christie (and Mercy Regional) ED Throughput Improvement (Andrew Collins and Christopher Day) and Medical Building Layout (Alex Johnson, Tucker Styrkowitz). (\$57,283).