

## **Curriculum Vitae (Abbreviated)**

Bei-Tseng (Bill) Chu

Department of Software and Information Systems

College of Computing and Informatics

UNC Charlotte, Charlotte, NC 28223.

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### **Areas of Specialization**

Enterprise Integration, Information Privacy and Security, e-Business Technologies, and Information Technology Education

### **Education**

- Ph.D., Computer Science, University of Maryland, College Park (1988)
- M.S., Computer Science, University of Maryland, College Park (1985)
- B.S., Electrical Engineering, *Magna Cum Laude*, University of Maryland, College Park (1982)

### **Academic positions**

- Professor of Software and Information Systems, UNC Charlotte, since 2001.
- Professor of Computer Science, UNC Charlotte 1999-2001.
- Associate professor Computer Science, UNC Charlotte 1993- 1999.
- Assistant professor Computer Science, UNC Charlotte 1988-1993.

### **Administrative positions**

- Chair, Department of Software and Information Systems, UNC Charlotte 2009-2012
- Interim Dean, College of Computing and Informatics UNC Charlotte, 2008-2009
- Founding Chair of the Department of Software and Information Systems, UNC Charlotte, 2001-2008.
- Interim Chair, Department of Computer Science, UNC Charlotte, 2001.
- Coordinator of the MS Information Technology, UNC Charlotte, since 2000
- Associate Director of the School of Information Technology, UNC Charlotte, 1998-2000.
- Director of the Ph.D. program in Information Technology, UNC Charlotte, 1998-2000.

### **Selected External Funding:**

1. Lipford, H., Chu, B. “Discovering Software Vulnerabilities through Interactive Static Analysis”, \$249,112, NSF, 9/2013-9/2016.
2. Al-Shaer, E., Chu, B. “I/UCRC Center for Configuration Analytics and Automation”, \$595,000, NSF, 5/2013-5/2018.
3. Chu, B., Lipford, H., Al-Shaer, E. Wu, X., and Wang, Weichao “Collaborative Project: Carolina Cyber Defender Scholarship”, 1129190, 9/1/2012-8/31/2016, \$2,929,518, NSF.

4. Lipford, H., Chu, B. “Collaborative Research: Supporting Secure Programming Education in the IDE”, 1044745, Sept. 2011 to Feb. 2014, \$183,589. NSF
5. Chu, B. “ Collaborative Project: Developing Faculty Expertise in Information Assurance through Case Studies and Hands-on Experiences”, 129413, Sept. 2011 to August 2013, \$50,000. NSF.
6. Dahlberg, T., Chu, B., Ribarsky, M., and Chen, K. “S-STEM: STARS Leadership Corps Computing Scholars: Pathways from Community College to Graduate School through Technical Excellence, Leadership, Service-learning and Community” \$600,000 National Science Foundation, 2010-2014.
7. Chu, B. Ahn, G., Wu, X., Kang, B., and Holt, T. “Carolina Cyber Defense Scholarship”, \$1,392,346, National Science Foundation, 2008-2012.
8. Ahn, G., Chu, B. and Shehab, M. “DoD Carolina Cyber Defender Program”, \$142,270, NSA, 2008-2009.
9. Chu, B. “DoD Carolina Cyber Defense Program”, \$90,960, NSA, 2007-2008.
10. Holt, T., Ahn, G., and Chu, B. “Examining the creation, distribution, and function of malware on-line.” , \$280,073, National Institute of Justice 2007-2009.
11. Kang, B., Chu, B., and Ahn, G. “Collaborative Project: Focused Faculty Development Workshop Cyber Game and Interactive Simulations”, \$246,000, National Science Foundation 2007-2009
12. Chu, B. Ahn, G. Zheng, Y., Tolone, W.J. Carolina Cyber-Defender Scholarship Program, \$650,000, National Science Foundation 2005-2009.
13. Chu, B. Ahn, G. Holt, T., Wang, Y. and B. Kang\_ Honeynet Research, \$150,000, e-Business Technology Institute 2005-2007
14. Chu, B. Lee, S., Ahn, G. Raja, A. Zheng, Y. and Tolone, W. J. Bridging IA Education through Collaboration. \$300,000, National Science Foundation 2004-2006.
15. Lee, S., Ahn, G., Chu, B. Critical Infrastructure Protection Initiative: DISCAP Automation, \$130,000, Space and Naval War Center (SPAWAR), 2004-2005
16. Chu, B., Ahn, G., Zheng, Y., Tolone, W.J., Liu, Z., Wang, Y. and\_ Dahlberg, T. Carolina Cyber-Defender Scholarship program, \$3,600,000, National Science Foundation, 2002-2006.
17. Ahn, G., Chu, B. Zheng, Y., Tolone, W.J., Liu, Z., Wang, Y. and Dahlberg, T. Carolina Cyber-Defender Scholarship program, \$408,000, National Security Agency 2002-2005.
18. William J. Tolone, Bei-tseng Chu, Wei-Ning Xiang, Mirsad Hadzikadic, David Wilson, Anita Raja, Teresa A. Dahlberg. Partnership with MCNC and IntePoint, LLC. Funding: \$725,468. Defense Intelligence Agency / Missile and Space Intelligence Center 2003-2004.
19. Chu, B., Ahn, G., Zheng, Y., and Tolone, W.J. Carolina Cyber-Defender Scholarship Program, \$150,000, National Security Agency 2001-2002.
20. Brown M. & Chu, B. Information authorization control. National Institute of Justice, \$104,000, 2000-2001.
21. Chu, B. & Tolone, W. J. Graduate Student Support, Selectron corporation. \$49,760, 1999-2000.
22. Tolone, W.J., Chu, B., Long, J. and Wilhelm, R. EECOMS – The Extended-Enterprise Coalition for Integrated Collaborative Manufacturing Systems.

- \$1,100,600 – part of a \$29.5M project funded by NIST/ATP, IBM, Integresoll-Rand, QAD, Berclain USA, Haley Enterprises, Vitria Technologies, Scandura, INDX and Envionit Soft. 1998-2001.
23. \_Chu, B. Long, J., Wilhelm, R., W. Tolone, & Zhang, Z. CIIMPLEX: Coalition for Intelligent Integrated Manufacturing Planning-Execution \$1,170,600 , part of a \$23M project funded by NIST/ATP, IBM, Ingersoll-Rand, QAD, Intercim, and Berclain USA. 1996-1999.
  24. \_Chu, B. Long, J. & Tolone, W. J. An Adaptive Methodology for Enterprise Integration ,IBM Corp. \$522,000, 1993-1998.
  25. Chu, B. Long, J. & Wilhelm, R. A Product-Family Based Approach to Computer Integrated Manufacturing \$257,000 , part of a \$3.2M NIST/ATP and IBM funded project. 1995-1996.
  26. Chu, B. Enhancing VLSI Circuit Yields through Identifying Design Sensitivities. \$86,038 , National Science Foundation. 1991-1994.
  27. Chu, B. & Schell, J. Research and Development of the IBM CIM Architecture, IBM Corp. \$535,000 , 1990-1993.

### **Curriculum Development Highlights**

- Co-Led (with G. Ahn and W.J. Tolone) the effort to develop the innovative Information Technology undergraduate program resulting in five fold increase in enrollment from 2001 through 2006, during a period where national enrollment in all computing fields have declined
- Co-Led\_ (with W.J. Tolone) the effort to develop the Master’s of Information Technology, and the graduate certificate program in Information Technology Management. Enrollment more than doubled since 2001.
- Founding director of the Information Technology Ph.D. program.
- Co-led (with G. Ahn) the effort to establish the Carolina Cyber Defender program with over \$5 M funding from federal government, one of the largest such programs in the U.S.
- Co-led (with G. Ahn) the effort of\_ developing hands-on cyber-game educational programs, culminating in winning the National Collegiate Cyber Defense Competition in 2006
- Led the effort organizing the South Eastern Collegiate Cyber Defense Competition in 2007.

### **Selected refereed publications:**

1. J. Portner, C. Kerr, B. Chu. “Moving Target Defense for XSS” in *The 7<sup>th</sup> International Symposium on Foundations & Practice of Security FPS’2014* Montreal, Canada, November, 2014.
2. H. Lipford, T. Thomas, B. Chu, and E. Murphy-Hill , E. “Interactive Code Annotation for Security Vulnerability Detection” in *2014 Workshop on Security Information Workers*, Phoenix, AZ, November, 2014.
3. Xiaohong Yuan, Kenneth Williams, Huiming Yu, Bill Chu, Audrey Rorer, Li Yang, Joseph Kizza, Kathy Winters, “A Workshop on Teaching Information Assurance through Case Studies and Hands-on Experiences,” *Proceedings of the*

- 47th Hawaii International Conference on System Science (HICSS 2014), Kona, Hawaii, USA, January, 2014.
4. J. Zhu, J. Xie, H. Lipford and B. Chu. "Support Secure Programming In Web Applications through Interactive Static Analysis" *Journal of Advanced Research*. Elsevier, Dec. 2013.
  5. J. Zhu, H. Lipford, and B. Chu "Interactive Support for Secure Programming Education" in *Proceedings of the Computer Science Education Conference*, March 2013 Denver, CO.
  6. X. Yuan, B. Chu, and H. Yu "Hands-on Laboratory Exercises for Teaching Software Security" in *Proceedings of the 16<sup>th</sup> Colloquium for Information Systems Security Education*, June 2012 Orlando, FL.
  7. J. Xie, H. Lipford, and B. Chu. Evaluating Interactive Support for Secure Programming. *ACM Conference on Human Factors in Computing Systems (CHI)* May 2012 Austin Texas. (Acceptance: 23%)
  8. J. Xie, B. Chu, H. Lipford, and J. Melton. ASIDE: IDE Support for Application Security. *Annual Computer Security Applications Conference (ACSAC-27)*, December 2011 Orlando Florida, pp. 267-276. (Acceptance: 20%)
  9. Jing Xie, Heather Richter Lipford, and Bill Chu. "Why Do Programmers Make Security Errors?" in *Proceedings of the IEEE Symposium on Visual Languages and Human Centered Computing (VL/HCC 2011)* September 2011.
  10. Jing Xie, Bei-Tseng Chu, and Heather Richter Lipford. "Interactive Support for Secure Software Development" in the *Proceedings of the International Symposium Engineering Secure Software and Systems (ESSoS 2011)*, February 2011, pp 248-255. (Acceptance 28.6%)
  11. Engin Tozal, Yongge Wang, Ehab Al-Shaer, Kamil Sarac, Bhavani Thuraisingham and Bei-Tseng Chu, "Adaptive Information Coding for Secure and Reliable Wireless Telesurgery Communications", Accepted in *ACM Springer Mobile Networks and Applications (MONET) Journal*, special issue on secure wireless communication.
  12. Lipford, H., Xie, J., Stranathan, W., Oakley, D., and Chu, B. "The Impact of a Structured Application Framework on Web Application Security", in the *Proceedings of the Colloquium for Information Systems Security Education (CISSE 2010)*, June 2010 pp. 212-219.
  13. K. Coble, W. Wang, Z. Li, and B. Chu "Secure Software Attestation for Military Telesurgical Robot Systems" *2010 Military Communications Conference*, 2010.
  14. Yu, H., Chu, B., Yuan, X., Mason, J. and Barnett, M., "Using a Practice Oriented Approach to Teach Web Security Course", *The Proceedings of the 2009 International Conference on Frontiers in Education: Computer Science and Computer Engineering*, July 2009.
  15. Chu, B., Stranathan, W., Cody, J., Peterson, J., Wenner, A. and Yu, H. "Teaching Secure Software Development with Vulnerability Assessment" in *Proceedings of the 13<sup>th</sup> Colloquium for Information Systems Security Education*, June 2009.
  16. Yu, H., Chu, B., Yuan, X., Mason, J., and Barnett, M., "Using a Practice Oriented Approach to Teach Web Security Course" , *International Conference on Frontiers in Education: Computer Science and Computer Engineering*, (2009).

17. Chu, B., Ahn, G., Blanchard, S., Deese, J., Kelly, R., Yu, H., Young, A. "Collegiate Cyber Game Design Criteria and Participation" in *the 6th IEEE International Conference on Computer and Information Sciences (ICIS 2007)*, July 2007.
18. Yu, H., Yuan, X., Xu, J., Providence, S., Chu, B. and Gu, D., "Bridge Information Assurance Education Gap between the Majority and Minority Universities through Collaboration", *The Proceedings of the 6th IEEE/ACIS International Conference on Computer and Information Science*, July 2007.
19. N. Paxton, G-J. Ahn, R. Kelly, K. Pearson and B. Chu "Collecting and Analyzing Bots in a Systematic HoneyNet-based Testbed Environment" in Proc. Of the 11<sup>th</sup> Colloquium for information Systems Security Education, Boston, MA June 4-7 2007.
20. Yuan, X. Qadha, Y., Xu, J., Yu, H., Archer, R., and Chu, B. "An Animated Learning Tool for Kerberos Authentication Architecture", *The Journal of Computer Sciences in Colleges*, April 2007.
21. B. Chu, H. Yu, A. Dance "USIS A Unified Framework for Secured Information Systems Lifecycle" in *The 9th International Joint Conference on Computer Science and Informatics* Oct. 8-11 2006 Kaohusiung City Taiwan.
22. D. Liboon, J. Xu, H. Yu, J. Zhang, X., Yuang, and B. Chu "An Educational Visualization Tool for Ddos Attack" in *The First Annual Conference on Education in Information Security*. Sept. 17-19 2006, Ames, Iowa.
23. Zhang, L. Ahn, G. and Chu, B. "A Rule-Based Framework for Role-Based Delegation and Revocation," *ACM Transactions on Information and System Security*, Vol.6, No.3, August 2003.
24. William J. Tolone, Bei-tseng Chu, Gail-Joon Ahn, Robert G. Wilhelm, John E. Sims "Challenges to Multi-Enterprise Integration: the EECOMS Experience" in *Enterprise Inter- and Intra- Organizational Integration*, \_Kosanke, K., Jochem, R., Nell, J., and Bas, A. (Eds), pp. 205-216, Kluwer Academic Publishers, 2003.
25. Longhua Zhang, Gail-Joon Ahn, Bei-Tseng Chu. "A Rule-Based Framework for Role-Based Delegation" in *6th ACM Symposium on Access Control Models and Technologies (SACMAT)*, Chantilly, VA, May 3-4, 2001
26. Chu, B. and Tan, K. "Distributed trust management for business-to-business e-commerce security" In *Proceedings of the ACME 2000 International Conference*, pp. 146-152, Aug. 2000.
27. R.G. Wilhelm, R. Chandrashekar, R. Sun, M. Hegedus, B. Chu, W. J. Tolone, and J. Long, "Finite Schedule Monitoring and Filtering in a Computer Integrated Manufacturing Environment", accepted for publication in the *Annals of CIRP*, 49/1, 2000.
28. Peng, Y., Finin, T., Labrou, Y. Cost, S., Chu, B, Tolone, W, Long, J., and Boughanamm A. "An Agent-Base Approach to Manufacturing Integration: The CIIMPLEX Experience", *Applied Artificial Intelligence, An International Journal*, Vol. 13(1-2), pp. 39-64, 1999.
29. Sun, R., Wilhelm, R., Chandrashekar, R., Hegadus, M., Chu, B., Tolone, W.J., & Long, J. "Integrated Manufacturing Schedule Repair Using Temporal Constraint Propagation" , *International Journal of Agile Manufacturing*, Vol 2. No. 1 pp. 13-26, 1999.

30. Sun, R., Chu, B., Wilhelm, R., & Yao, J. "A CSP-based Model for Integrated Supply Chains" in *Artificial Intelligence for Electronic Commerce* AAAI Press, pp. 92-100, 1999
31. B. Chu, R. Sun, R. Wilhelm, J. Yao, and W.J. Tolone. "Modeling Integrated Supply Chains" Conference of Pacific Rim Management, pp. 250-254, Aug. 1999.
32. B. Chu, R. Sun, R. Wilhelm, J. Yao, and W.J. Tolone. "Modeling Integrated Supply Chains" *Conference of Pacific Rim Management*, pp. 250-254, Aug. 1999.
33. "A negotiation-based Multi-agent System for Supply Chain Management", Chen, Y., Peng, Y., Finin, T., Labrou, Y., Cost, R.S., Chu, B., Sun, R., Wilhelm, Yao, J, to be presented at the *Workshop on Agent based Decision-Support for Managing the Internet-Enable Supply-Chain, The International Conference on Autonomous Agents (Agents '99)*, Seattle, May, 1999.
34. "A Multi-Agent System for Application Initialization in an Integrated Manufacturing Environment", Peng Y., Finin, T., Chen, L., Wang, L., Cost, S., Labrou, Y., Chu, B., Tolone, W.J., Cross, V., Russell, M., and Boughannam, A: *SCI/ISAS'99: The 3<sup>rd</sup>. World Multiconference on Systemics, Cybernetics and Informatics, and The 5<sup>th</sup>. Int'l Conference on Information Systems Analysis and Synthesis*, Orlando, July, 1999
35. Peng, Y., Finin, T., Labrou, Y., Chu, B., Long, J., Tolone, W.J. Boughannam, A: "A Multi-Agent System for Enterprise Integration", in *Proceedings of Practical Applications of Intelligent Agents and Multi-Agents Conference*, London, UK, March, 1998, 155-169.
36. Peng, Y., Finin, T., Labrou, Y., Chu, B., Long, J. Tolone, W.J. & Boughannam, A. "A Multi-Agent System for Enterprise Integration", *International Journal of Agile Manufacturing*, Vol. 1 No. 2 pp. 201-212, 1998.
37. Tolone, W.J., Chu, B. Long, J., Wilhelm, R., Finin, T., Peng, Y. & Boughannam, A. "Supporting Human Interactions within Integrated Manufacturing Systems", *International Journal of Advanced Manufacturing Systems* Vol. 1 No. 2 pp. 221-234, 1998.
38. Chu, B., Long, J., Matthews, M., Barnes, J., Sims, J., Hamilton, M., & Lambert, R. "FAIME: An Object-Oriented Methodology for Application Plug-and-Play", *Journal of Object-Oriented Programming*, Vol 11. No 5. Pp. 20-26, September 1998.
39. Chu, B., Long, J., Tolone, W. J., Wilhelm, R., Peng, Y., Finin, T., & Matthews, M. "Towards Intelligent Integrated Planning-Execution", *International Journal of Advanced Manufacturing Systems* 1(1) pp.77-83 1997.
40. Chu, B., Long, J., Tolone, W. J., Wilhelm, R., Peng, Y., Finin, T., & Matthews, M. "Towards Intelligent Integrated Planning-Execution", *The 1997 International Conference on Agile Manufacturing*, 1997.
41. Chu, B., Tolone, W. J., Wilhelm, R., Hegedus, M., Fesko, J., Finin, T., Peng, Y., Jones, C. Long, J., Matthews, M. Mayfield, J., Shimp, J., & Su, S. "Integrating Manufacturing Softwares for Intelligent Planning-Execution: A CIIMPLEX Perspective" in *Plug and Play Software for Agile Manufacturing* Boston, MA *Proceedings of SPIE* Vol. 2913. pp. 96-108, 1996.

42. Drake, D. C., Chu, B., Sims, J. Anderson, R. Hamilton, M. Lambert, R. Connard, M., Long, J., Sartin, A., Wayne, E. and Chen, J. "Framework for application interoperability in manufacturing enterprises" *Plug and Play Software for Agile Manufacturing* Boston, MA *Proceedings of SPIE* Vol. 2913. pp. 267-279. 1996.
43. Sims, J., Chu, B., Long, J., Barnes, J.G., Matthews, Hamilton, M., Drake, D. Anderson, R., Lambert, R., Jones, C. & Connard, M. "Framework for Adaptive Interoperability of Manufacturing Enterprises FAIME – A case study" in *Plug and Play Software for Agile Manufacturing* Boston, MA *Proceedings of SPIE* Vol. 2913. pp. 289-303. Nov. 1996.
44. Chu, B. Barnes, J.G., Sims, J. Matthews, M., Long, J., Hamilton, M., & Lambert, R. "Towards Plug-and-Play of Manufacturing Information Systems: The FAIME Perspective" *Proceedings of International CALs 96* LA, CA. Proceeding available on CDROM. Oct. 1996
45. Long, J., Chu, B., Barnes, J.G., Sims, J., Matthews, M., Chen, J. & Wayne, E. "Opening Up Legacy Systems for Interoperation: The FAIME Approach" *Proceedings of International CALs 96* LA, CA. Proceeding available on CDROM. Oct. 1996
46. Chu, B. "Supporting Units of Work in a Virtual Organization", in *Workshop on Software Architecture for Cooperative Systems*, Chapel Hill, NC 1994, ACM SIGOIS Volume 15, Nov. 3 pp. 7-9 1995.
47. Chu, B., Long, J., Shanmugasunda, P., Govinda, V, & Jaeger, R. "Concurrent Engineering of Process and Information Systems", in *First International Conference on Concurrent Engineering* pp. 89-96, Pittsburgh, PA, 1994.
48. Chu, B. & Du, H. "CENTER: A System Architecture for Matching Design and Manufacturing" in *Methodologies for Intelligent Systems*, Komorowski, J. and Ras, Z. (Eds.) Springer-Verlag, Berlin, pp. 591-600, 1993
49. Chu, B. "Fault Diagnosis with Continuous System Models" in *IEEE Transaction on Systems, Man and Cybernetics*, SMC 23(1) pp. 55-64, 1993
50. Chu, B. "Diagnosis with Continuous and Discrete Causal Relationships: Knowledge Representation" in *International Journal of Pattern Recognition and Artificial Intelligence* Volume 6 No 4, pp. 731-751, 1992
51. Chu, B. "Equipment/Instrument Diagnosis with Continuous and Discrete Causal Relationships" in *Intelligent Modeling, Diagnosis, and Control of Manufacturing Processes* Chu, B. and Chen, S. (Eds), pp. 183-210, World Scientific Publishers, 1992
52. Chu, B. & Chen, S. (Eds) "Intelligent Modeling Diagnosis, and Control of Manufacturing Processes," World Scientific Publishers, 1992
53. Chu, B. & Reggia, J. "Modeling Diagnosis at Multiple Levels of Abstraction I. Representing Causal Relations at Multiple Levels of Abstraction", in *International Journal of Intelligent Systems* V.6, pp.617-644, 1991
54. Chu, B. & Reggia, J. "Modeling Diagnosis at Multiple Levels of Abstraction II. Diagnostic Reasoning at Multiple Levels of Abstraction", in *International Journal of Intelligent Systems* V.6, pp.645-671, 1991
55. Chu, B. "On the Representation of Continuous Causal Relationships" in *Methodologies of Intelligent Systems* Ras, Z (Ed), Springer-Verlag, 1991

56. Chu, B. "Intelligent Process Modeling" in Methodologies of Intelligent Systems 5, Z. Ras, M. Zemankova, & M. Emrich (Eds.) North-Holland, pp. 25-32, 1990
57. Chu, B. & Reggia, J. "Modeling Diagnostic Problem-Solving at Multiple Levels of Abstractions", in *IEEE 6<sup>th</sup> Conference on AP Applications* pp.56-61, 1990
58. Chu, B. "Representing Binary Relations at Multiple Levels of Abstractions" in *Methodologies of Intelligent Systems* Ras, Z. (Ed), North Holland, 1989

### **Invited Speaker**

- OWASP APPSEC USA 2014 "Moving Target Defense for XSS" September 2014, Denver Co.
- OWASP APPSEC USA 2012 "Using Interactive Static Analysis for Early Detection of Software Vulnerabilities", October, 2012 Austin, TX.
- OWASP APPSEC USA 2011 "Secure Programming Support in IDE", September 2011 Minneapolis, MN.

### **Selected Professional Service**

- NSF Summit on Secure Software Development Education (2010)
- NSF Advisory Committee on Federal Work Force Development (2010)
- Organization Committee of ACM CCS (2009, 2010)
- Program Chair of annual UNC Charlotte Security and Privacy Symposium (2001, 2003-2009)
- Program Chair of UNC Charlotte Annual Software as a Service and Cloud Computing Conference (2011)
- Founding member North Carolina Infragard Chapter board of directors (2002-2003)

### **Diversity in Computing**

- Established a distance education program at NC A&T State University 2001-Present
- Increased the diversity of both faculty and students in the department
  - Percentage of women students is twice the national average
  - Percentage of African American student is four times the national average among graduate students and twice the national average among undergraduate students

### **Adjunct Professorship**

- Shanghai Electric Power University 1997-Present
- Fundan University 2003-2006

### **Professional Membership**

- Association of Computing Machinery
- Open Web Application Security Group

- Infragard
- Electronic Crime Task Force