

**Tiffany Barnes**  
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University of North Carolina at Charlotte  
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**EDUCATION AND EXPERIENCE**

PhD 2003 North Carolina State University Computer Science  
MS 2000 North Carolina State University Computer Science & Mathematics  
BS 1995 North Carolina State University Computer Science & Mathematics

Professional History

Associate Professor	UNC Charlotte	August 2004 – Present
o Director of Graduate Certificate in Game Design & Development		
Distance Ed. Course Developer & Instructor	NC State University	2002-Present
Postdoctoral Researcher	NC State University	January - August 2004
Graduate Assistant	NC State University	1996-2003
Girls on Track Technical Director	NCSU & Meredith	Summers 2000-2007

**RESEARCH**

Research Interests

- Advanced Learning Technologies, Educational Data Mining, Artificial Intelligence
- Broadening Participation in Computing
- Game Design and Development, particularly for educational games

Research & Travel Grants

1. Recommended. Dahlberg, Barnes, Lipford. **BPC-AE: Scaling the STARS Alliance: A National Community for Broadening Participation through Regional Partnerships**, NSF – BPC, \$3.75M, Jan. 2011- Jan 2016.
2. Barnes, T. **CAREER: Educational Data Mining for Student Support in Interactive Learning Environments**, NSF-ALT, \$646,982, Jul 2009 – Jun 2014.
3. Dahlberg, Barnes. **REU Site: Socially Relevant Computing Research: Visualization, Virtual Environments, Gaming, and Networking**, NSF-REU Site, \$300K, Mar. 2009- Feb. 2011.
4. Barnes, T., Pilot: **Game2Learn: Creative Computing Education**, NSF-CreativeIT, \$216K, July 2008- June 2010.
5. Barnes, T. Collaborative Research: BPC-D: Improving Minority Student Participation in the Computing Career Pipeline with **Culturally Situated Design Tools (CSDTs)**, NSF-BPC, \$235K, Jan. 2007- Dec. 2009
6. Dahlberg, Barnes. BPC-AE: The **STARS Alliance: The Southeastern Partnership for Diverse Participation in Computing**, NSF – BPC, \$2.6M, Mar. 2008- Mar. 2010
7. Dahlberg, Barnes. BPC-A: The **STARS Alliance: The Southeastern Partnership for Diverse Participation in Computing**, NSF – BPC, \$2.2M, Mar. 2006- Mar. 2009.
8. PI: Dahlberg. Sr. Personnel: Barnes, Hodges, Ribarsky. **REU Site: Computing Research for Undergraduates: Visualization, Virtual Environments, Gaming, and Mobile Robotics & Networking**, NSF- REU Site, \$300K, Mar. 2006 - Mar. 2009.
9. NSF Travel Award for SIGCSE 2005 & CRAW Career Mentoring workshop, \$600
10. NSF Travel Award for 2005 Broadening Participation in Computing Grant Meeting, \$650

## Research Award Nominations

1. Nominated for UNC Charlotte CCI “Faculty Research Award” 2008-2009
2. Nominated for UNC Charlotte Woman of the Year Award 2008-2009
3. Nominated by UNC Charlotte for Microsoft New Faculty Fellowship, 2005, 2006, 2007
4. Nominated for Anita Borg Institute “Denice Denton Emerging Leader Award” 2007, 2009, 2010

## Research Advising

- **11 Current PhD students** (with start dates), 1 graduating, 1 with completed Master’s Thesis:
  1. John Stamper S06 **Dissertation:** Automatic generation of intelligent tutoring capabilities via educational data mining
    - Graduation May 2010
    - Hired at **Carnegie Mellon** as a System Scientist, August 2009
    - 2007 AIED, 2006 AAI Doctoral Consortia
    - **2007 NSF EAPSI Fellow** for study in Korea
  2. Eve Powell F07 Game2Learn: Ubiquitous Games & Dance Tool
    - **2008 NSF Graduate Research Fellow**
    - **2007 GAANN Fellow**
    - **2006-2007 CCI Essam El-Kwae Undergraduate Research Award**
  3. Amanda Chaffin F06 Game2Learn: Coding in-game, GAANN Fellow
    - **2009 Masters Thesis:** Game2Learn: Building a compiler into a game engine to increase learning gains in computer science students
    - **2009 GAANN Fellow**
  4. Michael Eagle S08 Educational Data Mining
    - **1<sup>st</sup> place, 2007 Tapia ACM Undergraduate Student Research Competition**
    - 2008 GAANN Fellow, NSF 2008 GRF Honorable Mention
    - Accepted to Doctoral Consortium at ACM ICFDG 2009, **2010 NSF EAPSI Fellow**
  5. Lorrie Lehman S08 Educational Data Mining
  6. Andrea Nickel F08 cMotion Autism Game, 2008 GAANN Fellow
  7. Andrew Hicks F09 Game2Learn, 2009 GAANN Fellow
  8. Acey Boyce F09 CSDT Virtual Bead Loom Game,
    - **2010 NSF GRF Honorable Mention**
    - **2009 GAANN Fellow**
  9. Matthew Johnson F09 Educational Data Mining
  10. Katelyn Doran F10 Educational Games, NASA Graduate Research Fellow
  11. Rachel Brinkman F10 Educational Data Mining and Games
- **8 Masters project advisees** (1 MS Thesis, see above):
  12. Sandhya Charugulla F09 CSDT Dance Tool Game Development
  13. Laura Hassey F09 STARS Alliance Evaluation
  14. Su Hyung Cho S09 CSDT Dance Tool Game Development
  15. Isaac Moore S06 Coding In-Game Requirements Engineering
  16. Johnny Hopkins F05 Networking for Game2Learn
  17. Ted Carmichael S05 Intelligent Tutoring for Nurse Training
  18. Rath. Ramanujam S05 The Q-Matrix Method for Face Recognition
  19. Rath. Ramanujam F04 Modeling Protein Translation in Prokaryotes
- **40 undergraduate research** projects (\*= entered CS graduate program)
  - Current Undergraduates, Advisees for Research or Senior Projects
    1. Dustin Culler REU 2010: CSDT Community Site
    2. Shaun Pickford REU 2010: CSDT Community Site & Dance Tool
    3. Meena Seralathan REU 2010: Final Reality iPhone exergame

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| 4. Veronica Catete  | REU 2010: Bots programming educational game                  |
| 5. Joshua Situka  | REU 2010: Bots programming educational game                  |
| 6. Lance Newby  | Senior Project F09: Charlotte Dancesport website development |
| 7. Bethany Miller   | REU Site 2009: Game2Learn “Bunny Generals & Heap Game”       |
| 8. Thomas Phifer  | REU Site 2009-10 & AY09-10: “Snag’em Conference Game”        |
| 9. Samantha Finkelstein   | REU Site 2008 & AY09-10: “Games for children with Autism”    |
| • <b>2009-2010 CCI Essam El-Kwae Undergraduate Research Award</b>                 |  |
| 10. Jordana Hodges  | REU Site 2007: Game2Learn “Australian Fire Ecology Game”     |
| o Name, Graduation Date, and Project of Undergraduate Students who have Graduated |  |
| 11. *Antoine Campbell   | REU 2009/Sr. Project 2009, REU 2010: G2L Bunny Generals      |
| 12. Christie Thornton   | REU Site 2009 & AY 2009-10: CSDT “Dance Tool”                |
| 13. *Rachel Brinkman  | CRA-DREU 2009: “Table Tilt iPhone Conference Game”           |
| 14. *Katelyn Doran  | REU Site 2008 & AY08-10 AY REU: “Bunny Generals”             |
| 15. Jasamine Jackson  | May 2009 CRA-DMP REU Summer 2008: Dance Tool                 |
| 16. *Hanan Al Nizami  | May 2009 CRA-DMP REU Summer 2008: Dance Tool                 |
| 17. Michelle Chamberlain  | May 2009 CRA-DMP REU Summer 2007-8: Game2Learn               |
| 18. *Drew Hicks   | May 2009 REU Site 2008: Game2Learn                           |
| 19. Henry Van Eseltine  | May 2009 Senior Project: Game2Learn                          |
| 20. Joshua Darnell  | May 2009 Senior Project/REU: CSDT Dance Tool                 |
| 21. *Lane Harrison  | May 2009 Senior Project 2008-9: G2L “cMotion game”           |
| 22. *Shana Collins  | May 2008 JCSU McNair Scholar 2006-7: Ed. Data Mining         |
| 23. *Laura Hassey   | May 2008 STARS REU 2007-8: Alliance Evaluation               |
| 24. Abigail Corfman   | May 2008 REU Site 2007: Game2Learn “Logo Game”               |
| 25. Taylor Dubois   | May 2008 REU Site 2007: Game2Learn “Bunny Arrayser”          |
| 26. *Michael Eagle  | Dec 2007 REU Site 2007/ Sr. Project: G2L “Wu’s Castle”       |
| 27. *Eve Powell   | May 2007 REU Site 2006/ Sr. Project: G2L “Saving Sera”       |
| 28. Dimitris Couchell   | Dec 2007 Senior Project 2007: G2L “Unreal Dev.”              |
| 29. Tiffany Ralph   | May 2007 CRA-DMP REU Summer 2006: Game2Learn                 |
| 30. Paige Matthews  | May 2007 CRA-DMP REU Summer 2006: Game2Learn                 |
| 31. Hyun Jordan   | May 2007 CRA-DMP REU Summer 2006: Game2Learn                 |
| 32. *Casey Paver  | Dec 2006 Senior Project/Ind.Study 2005-6: G2L in Flash       |
| 33. *Alex Godwin  | Dec 2006 REU Site 2006/ Sr. Project: G2L “MMOGs”             |
| 34. *Amanda Chaffin   | May 2006 REU Site 2006/ Sr. Project: G2L “Catacombs”         |
| 35. Brian Ingles  | May 2006 Senior Project 2005-6: Building Games in Java       |
| 36. David Markham   | May 2006 Senior Project 2005-6: Game2Learn                   |
| 37. Nathaniel Watson  | May 2006 Senior Project 2005-6: Game2Learn                   |
| 38. *Rachael Dwight   | Dec. 2005 Senior Project 2005-6: G2L: “Coding in DLLs”       |
| 39. Carson Black  | May 2005 Senior Project 2004-5: The Director’s Assistant     |
| 40. Daniel Curtis   | May 2005 Senior Project 2004-5: The Director’s Assistant     |

#### Ph.D. and MS Graduate Committees

- 5 UNCC PhD: Fritz Heckel (2011), Hunter Hale (2011), Wenxin Jiang (2009), Rory Lewis (2008), Cathy Zambaka (2007), Sabarish Babu (2007)
- 2 NCSU External: Kristy Boyer (NCSU, 2010), Lalit Ponnala (NCSU, 2007).
- 2 Masters Thesis: Priyesh Dixit (2008), Kalpani Tiwani (2005)

#### **PUBLICATIONS AND PRESENTATIONS (\*= representative paper)**

##### Published Journal Papers (fully refereed)

1. S. Finkelstein, A. Nickel, Z. Lipps, T. Barnes, Z. Wartell, E. Suma. (2011). Astrojumper: Motivating exercise with an immersive virtual reality exergame. Accepted to appear in *Presence*.
2. Dahlberg, T., T. Barnes, K. Bean, & K. Buch. (2010). Engaging Under-represented Computer

Science Students in Service: An Innovative Course and Case Study Findings. *Computer Science Education*, in press.

3. T. Dahlberg, T., Barnes, K. Buch, and A. Rorrer. (2010). The STARS Alliance: viable strategies for attracting, retaining, supporting, and developing underrepresented students in computing. Association of Computer Machinery, In press. *Transactions on Computing Education*.
4. T. Barnes, T. Dahlberg, K. Buch, and K. Bean. (2009). The STARS Leadership Corps: An innovative computer science learning community. *Learning Communities Journal*, 1, 5-18.
5. Barnes, T. & J. Stamper. (2010). Automatic hint generation for logic proof tutoring using historical data. *Journal of Educational Technology & Society*, Vol. 13, Issue: 1- *Special issue on Intelligent Tutoring Systems*, pp. 3-12.
6. Bell-Watkins, K., Barnes, T., and Thomas, N. (2009). Developing computing identity as a model for prioritizing dynamic K-12 computing curricular standards. *J. Comput. Small Coll.* 24, 3 (Jan. 2009), 125-131.
7. Berenson, S.B., M. Droujkova, L. Cavey, N. Smith, & T. Barnes. (2000). Girls on Track with information technology. *Meridian*, 3 (1), Winter 2000. [<http://www.ncsu.edu/meridian/2000wint/math/index.html>].
8. Barnes, T. & C.D. Savage. (1997). Efficient generation of graphical partitions. *Discrete Applied Mathematics*, 78 (1997). p 17-26.
9. Barnes, T. & C.D. Savage. (1995). A recurrence for counting graphical partitions. *Electronic Journal of Combinatorics*. Volume 2, R11. 1995.

#### Fully Refereed Published Book Chapters and Edited Proceedings

10. Barnes, T. & J. Stamper. (2010). Using Markov decision processes for student problem-solving visualization and automatic hint generation. *Handbook on Educational Data Mining*. CRC Press.
11. Barnes, T. (2010). Novel derivation and application of skill matrices: The q-matrix method. *Handbook on Educational Data Mining*. CRC Press.
12. Croy, M., T. Barnes, J. Stamper. (2007). Towards an Intelligent Tutoring System for propositional proof construction. In Philip Brey, Adam Briggie and Katinka Waelbers (eds.), *Proceedings of the 2007 European Computing And Philosophy Conference*, Amsterdam, Netherlands: IOS Publishers. (30 presenters invited to submit full papers; 76 abstracts presented).
13. Barnes, T., S.B. Berenson, M. Vouk. (2006). On participation of women in information technology, In: Trauth, E. (Ed.). *Encyclopedia of Gender and Information Technology*. Idea Group Publishing.
14. Barnes, T., S.B. Berenson, M. Vouk. (2006). Young women and persistence in information technology, In: Trauth, E. (Ed.). *Encyclopedia of Gender and Information Technology*. Idea Group Publishing.

#### Fully Refereed Papers in Conference Proceedings

15. S. Finkelstein, E. Powell, A. Hicks, T. Phifer, K. Doran, S. Charugulla, and T. Barnes (2010). SNAG: Using social networking games to increase student retention in computer science. To appear in Innovation and Technology in Computer Science Education (Ankara, Turkey, Jun. 26-30, 2010). ITiCSE '10. ACY, New York, NY.
16. E. Powell, S. Finkelstein, A. Hicks, T. Phifer, S. Charugulla, C. Thornton, T. Barnes, and T. Dahlberg. (2010). SNAG: social networking games to facilitate interaction. In *Extended Abstracts*

on *Human Factors in Computing Systems*, Atlanta, GA, Apr. 10-15, 2010. CHI EA '10. ACM, New York, NY, 4249-4254.

17. Chaffin, Amanda, and T. Barnes. (2010). Lessons from a course on serious games research and prototyping. *Proceedings of the 5<sup>th</sup> ACM Intl. Conf. Foundations of Digital Games (FDG 2010)*. Monterey, CA, USA, June 19-21, 2010. (34% acceptance rate, 32/94 full paper submissions)
18. Boyce, Acey, and T. Barnes. (2010). BeadLoom Game: Using Game Elements to Increase Motivation and Learning. *Proceedings of the 5<sup>th</sup> ACM Intl. Conf. Foundations of Digital Games (FDG 2010)*. Monterey, CA, USA, June 19-21, 2010. (34% acceptance rate, 32/94 full paper submissions)
19. Katelyn Doran, Acey Boyce, Samantha Finkelstein, Tiffany Barnes. (2010). Short Paper: Reaching out with Game Design. *Proceedings of the 5<sup>th</sup> ACM Intl. Conf. Foundations of Digital Games (FDG 2010)*. Monterey, CA, USA, June 19-21, 2010. (25% acceptance rate, 3/12 short paper submissions)
20. Stamper, J., T. Barnes & M. Croy. (2010). Using a Bayesian knowledge base for hint selection on domain specific problems. *Proceedings of the 2010 Intl. Conf. on Educational Data Mining (EDM 2010)*. Pittsburgh, PA, USA, June 11-13, 2010. (poster)
21. Stamper, J., T. Barnes, & M. Croy. (2010). Enhancing the automatic generation of hints with expert seeding. *Proceedings of the 2010 Intl. Conf. on Intelligent Tutoring Systems (ITS 2010)*. Pittsburgh, PA, USA, June 14-18, 2010. (30% acceptance rate)
22. \* Chaffin, A., K. Doran, D. Hicks, & T. Barnes. **Experimental Evaluation of Teaching Recursion in a Video Game**. *Sandbox 2009: ACM SIGGRAPH Video Game Proceedings*.
23. Barnes, T., J. Stamper. (2009). Utility in hint generation: Selection of hints from a corpus of student work. *14<sup>th</sup> Intl. Conf. on AI in Education (AIED) 2009*, Brighton, UK, July 6-10, 2009. (poster)
24. Stamper, J. & T. Barnes. (2009). An Unsupervised, Frequency-based Metric for Selecting Hints in an MDP-based Tutor. *2<sup>nd</sup> Intl. Conf. on Educational Data Mining (EDM 2009)*, Cordoba, Spain, July 1-3, 2009, pp. 180-189. (37% acceptance rate, 20/54 paper submissions)
25. Eagle, M., T. Barnes. Evaluation of a Game-based Lab Assignment. *ACM Foundations of Digital Games*, Orlando, FL, April 26-30, 2009. (19.6% acceptance rate, 9/46 paper submissions)
26. \* Eagle, M., T. Barnes. Experimental evaluation of an educational game for improved learning in introductory computing. *ACM SIGCSE 2009*, Chattanooga, TN, March 3-8, 2009. (Paper, 33% acceptance rate, 100/302 submissions)
27. Wolz, U., Barnes, T., Bayliss, J., Cromack, J. Girls Do Like Playing and Creating Games. *ACM SIGCSE 2009*, Chattanooga, TN, March 3-8, 2009. (Panel, 55% acceptance rate, 11/20 submissions)
28. Dahlberg, T., T. Barnes, A. Rorrer, C. Seals, M. Lustria, L. Hawkes. The STARS Leadership Corps: Case studies in broadening participation in computing. In *IEEE Frontiers in Education 2008*, Saratoga Springs, NY, October 22-25, 2008.
29. John C. Stamper & Tiffany Barnes: The Validity of Providing Automated Hints in an ITS Using a MDP. *AAAI 2008*: 1830-1831. (student paper)
30. Eagle, M., T. Barnes. Wu's Castle: Teaching Arrays and Loops in a Game. *ACM ITiCSE 2008*, Madrid, Spain, July 2008. (39% acceptance rate, 60/151 submissions)
31. \* Barnes, T., J. Stamper. **Toward automatic hint generation for logic proof tutoring using historical student data**. In *Proc. 9th International Conference on Intelligent Tutoring Systems*

- (ITS2008), Montreal, Canada, June 23-27, 2008. **Best paper nominee.** (7 nominees) (32.6% acceptance rate, 61/187 submissions)
32. Barnes, T., J. Stamper, L. Lehman, M. Croy. A pilot study on logic proof tutoring using hints generated from historical student data. *1st Annual International Conference on Educational Data Mining*, Montreal, CA, June 20-21, 2008, pp. 197-201.
  33. Barnes, T., E. Powell, A. Chaffin, H. Lipford. Game2Learn: Improving the engagement and motivation of CS1 students. *ACM GDCSE 2008*. (25% acceptance rate; 15 of 60 submissions)
  34. Dahlberg, T., T. Barnes, A. Rorrer. Improving retention and graduate recruitment through immersive Research Experiences for Undergraduates. *ACM SIGCSE Symposium on Computer Science Education 2008*.
  35. Dahlberg, T., T. Barnes, A. Rorrer. (2007). The STARS Leadership Model for Broadening Participation in Computing. *Proc. IEEE Frontiers in Education Conference*, Milwaukee, WI, Oct 10-13, 2007. (425 papers, workshops and panels accepted from 730. Full paper rate reported as 50% but not confirmed online)
  36. \* Barnes, T., J. Stamper. (2007). Toward the extraction of production rules for solving logic proofs. In *Proc. 13th Intl. Conf. on Artificial Intelligence in Education, Educational Data Mining Workshop (AIED2007)*, Marina del Rey, CA, July 8, 2007.
  37. John C. Stamper, Tiffany Barnes, Marvin J. Croy. Extracting Student Models for Intelligent Tutoring Systems. *AAAI 2007*: 1900-1901. (student paper).
  38. Barnes, T., H. Richter, E. Powell, A. Chaffin, A. Godwin. (2007). Game2Learn: Building CS1 learning games for retention. *Proc. ACM Conference on Innovation and Technology in Computer Science Education (ITiCSE2007)*, Dundee, Scotland, June 25-27, 2007. (30% acceptance rate)
  39. Babu, S., Suma, E., Barnes, T., Hodges, L. (2007). Can immersive virtual humans teach social conversational protocols? As a sketch paper in *IEEE Conference on Virtual Reality 2007*, Charlotte, NC. (acceptance rate: 27%)
  40. Babu, S., S. Schmutge, T. Barnes, L. Hodges. (2006). ). “What Would You Like to Talk About?” An Evaluation of Social Conversations with a Virtual Receptionist, *Proceedings of the Sixth International Conference on Intelligent Virtual Agents (IVA 2006)*, Marina del Rey, CA, 2006.
  41. \* Barnes, T., J. Stamper, T. Madhyastha. (2006). Comparative analysis of concept derivation using the q-matrix method and facets. *Proceedings of the AAAI 21st National Conference on Artificial Intelligence Educational Data Mining Workshop (AAAI2006)*, Boston, MA, July 17, 2006.
  42. Barnes, T. (2006). Evaluation of the q-matrix method in understanding student logic proofs. *Proceedings of the 19th International Conference of the Florida Artificial Intelligence Research Society (FLAIRS 2006)*, Melbourne Beach, FL, May 11-13, 2006.
  43. Wolz, U., T. Barnes, I. Parberry. (2006). Digital games as vehicles for learning, *ACM Technical Symposium on Computer Science Education (SIGCSE)*, Houston, Texas, USA, March 1-5, 2006.
  44. Babu, S., S. Schmutge, R. Inugala, S. Rao, T. Barnes, L. Hodges. (2005). Marve: A prototype virtual human interface framework for studying human-virtual human interaction, *Proceedings of the Fifth International Working Conference on Intelligent Virtual Agents (IVA 2005)*, Kos, Greece, September 12-14, 2005.

45. Barnes, T. (2005). Experimental analysis of the q-matrix method in automated knowledge assessment. *Proceedings of the IASTED International Conference on Computers and Advanced Technology in Education (CATE 2005)*, August 29-31, 2005, Oranjestad, Aruba.
46. Barnes, T. (2005). The q-matrix method: Mining student response data for knowledge. *Proceedings of the AAAI-2005 Workshop on Educational Data Mining*, July 9-13, 2005, Pittsburgh, PA. (Acceptance rate: 47%)
47. Barnes, T., D. Bitzer, & M. Vouk. (2005). Experimental analysis of the q-matrix method in knowledge discovery. *Proc. 15th Intl. Symposium on Methodologies for Intelligent Systems 2005*, May 25-28, 2005, Saratoga Springs, NY.
48. Ponnala, L., T. Barnes, D. Bitzer, M. Vouk, & A. Stomp. (2004). A signal-processing based model for analyzing programmed frameshifts. *IEEE International Workshop of Genomic Signal Processing and Statistics*, May 22-24, 2004, New Port, RI.
49. Ponnala, L., T. Barnes, D. Bitzer, & M. Vouk. (2004). Ribosome tail ends as "signal detectors" for protein production in prokaryotes. *Proc. IEEE "Technology for Life" NC Symposium on Biotechnology & Bioinformatics 2004*, Oct. 13-15, Raleigh, NC.
50. Ponnala, L., T. Barnes, D. Bitzer, & M. Vouk. (2004). The search for the optimal 3' tail end in E. coli. *Proc. of the 26th Annual Intl. IEEE Engineering in Medicine and Biology Conference (EMBC) 2004*, Sep. 1-5, 2004, San Francisco, CA.
51. Barnes, T., & D. Bitzer. (2002). Evaluation of the q-matrix method of fault tolerant knowledge assessment. *Proc. E-Learn 2002 World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education*, Montreal, CA, Oct. 2002. (Acceptance rate: 25-39%)
52. Barnes, T., & D. Bitzer. (2002). Fault tolerant teaching and automated knowledge assessment. *Proceedings of the 40th Annual ACM Southeast Conference (ACMSE'02)*, Raleigh, NC, April 27, 2002, pp. 125-132.
53. Cavey, L., & T. Barnes. (2001). Mathematics teachers on track with technology - Problem-based mathematics teacher preparation. *Proc. 12th International Conference of the Society for Information Technology & Teacher Education (SITE 2001)*, Orlando, FL, March 8, 2001, pp. 1343-1347.
54. Alspaugh, T., A. Antón, T. Barnes, & B. Mott. (1999). An integrated scenario management strategy. *IEEE Fourth International Symposium on Requirements Engineering (RE'99)*, University of Limerick, Ireland, 7-11 June 1999, pp.142-149.

#### Abstract Refereed Papers in Conference Proceedings

55. Barnes, T. Dahlberg, K. Bean. (2009). Workshop: How to start a STARS Leadership Corps to improve retention and recruiting in computing. *Tapia Celebration of Diversity in Computing*, Portland, OR, Apr. 1-4, 2009.
56. Finkelstein, S. A. Nickel, L. Harrison, E. Suma, & T. Barnes. cMotion: A New Game Design to Teach Emotion Recognition and Programming Logic to Children using Virtual Humans. *IEEE Virtual Reality*. Lafayette, LA. Mar. 14-18, 2009.
57. Barnes, T. (2009). BoF: Sustaining efforts to broaden participation in computing. *ACM SIGCSE 2009*, Chattanooga, TN, March 3-8, 2009.
58. Barnes, T., D. Cliburn, B. Ladd. (2009). Workshop: Introduction to Game Development. *ACM SIGCSE 2009*, Chattanooga, TN, March 3-8, 2009.

59. B. Ladd, T. Barnes, D. Cliburn. (2009). Workshop: Advanced Game Courses in Computer Science: Getting Beyond Square One with Torque. *ACM SIGCSE 2009*, Chattanooga, TN, March 3-8, 2009.
60. Barnes, T., T. Dahlberg. (2007). BoF: Evaluating Diversity Initiatives to Broadening Participation in Computing, *Tapia Celebration of Diversity in Computing*, Orlando, FL, Oct. 17-20, 2007.
61. Barnes, T., T. Dahlberg. (2007). Innovation in Broadening Participation in Computing: STARS Leadership Corps, Panel at *Tapia Celebration of Diversity in Computing*, Orlando, FL, October 17-20, 2007.
62. Dahlberg, T., T. Barnes, K. Boyer, C. Seals, M. Lustria, A. Lawrence, J. Strothman. (2007). Developing student leaders to invent the future, Panel at *Grace Hopper Celebration of Women in Computing*, Orlando, FL, Oct. 14-17, 2007.
63. Barnes, T., T. Dahlberg. (2006). The STARS Alliance: Experiences in Broadening Participation in Computing. *Grace Hopper Celebration*, San Diego, CA, Oct. 4-7, 2006.
64. Clua, E., B. Feijó, J. Schwartz, M. Graças, K. Perlin, R. Tori, T. Barnes. (2006). Games and Interactivity in Computer Science Education. (Panel) *ACM SIGGRAPH 2006*, Boston, MA.

#### Other Publications

65. Tiffany Barnes, L. Miguel Encarnação, Christopher D. Shaw, "Serious Games," *IEEE Computer Graphics and Applications*, vol. 29, no. 2, pp. 18-19, March/April, 2009.
66. Ingles, B. (2006). The future of Java game development. *Proc. ACM Southeast Conference, (ACMSE 2006)*. Melbourne, FL. Mar. 10-12, 2006. (Undergraduate Advisee paper)

#### Presentations at Professional Meetings

1. Barnes, T., K. Buch, & A. Rorrer. (2009). Workshop: Evaluation Training for Academic Liaisons and Evaluator Assistants. STARS Celebration 2009. Tallahassee, FL, August 9-12, 2009.
2. T. Barnes & R. Eglash. (2009). Workshop: CSDTs for Outreach. STARS Celebration 2009. Tallahassee, FL, August 9-12, 2009.
3. Eglash, R., T. Barnes, & C. Lewis. (2009). Conducting Middle and High School Outreach with Culturally Situated Design Tools. STARS Celebration 2009. Tallahassee, FL, August 9-12, 2009.
4. Barnes, T., K. Buch, & A. Rorrer. (2009). The Impact of the STARS Alliance: A Comprehensive Overview of Results. STARS Celebration 2009. Tallahassee, FL, August 9-12, 2009.
5. Barnes, T., C. Seals, M. Eagle, & K. Boyer. (2009). CRA-W Faculty Mentoring – Managing your Advisor: Advising your Students. STARS Celebration 2009. Tallahassee, FL, August 9-12, 2009.
6. Barnes, T. (2009). Opportunities in Game Development and Research. STARS Celebration 2009. Tallahassee, FL, August 9-12, 2009.
7. Croy, M., T. Barnes, J. Stamper (2008). "Generating Helpful Hints for Propositional Proof Construction." Presented at the 2008 European Computing and Philosophy Conference, Montpellier, France, June 2008.
8. Black, D. & T. Barnes. (2006). The Director's Notebook. Conference of the Association for Theater in Higher Education. August 2007.
9. Young, M., T. Barnes, F. Boosman, J. Heneghan, D. Sung. (2005). Computer Games In Serious Applications: Education, Training and Beyond. Panel presentation at the Center for Entrepreneurial Development Fifteenth Annual InfoTech Conference (InfoTech05), Research



Triangle Park, NC, USA, October 12, 2005.  
<http://www.cednc.org/conferences/infotech/2005/speakers/>

10. Ponnala, L., T. Barnes, D. Bitzer, & M. Vouk. (April 2004). The search for the optimal 3' ribosome tail in *E. coli*. Poster presented at the Biomedical Engineering Review, UNCCH, Chapel Hill, N.C.
11. Barnes, T., L. Cavey, & N. Smith. (September 2000). Girls on Track: Using technology as a tool for community investigations. Paper presented at the Annual Technology Exposition, North Carolina State University, Raleigh, NC.
12. Knight, V., L. Cavey, T. Barnes, & N. Smith. (January 2000). Girls on Track: Middle grade girls modeling community problems - An experiment in progress. Presented at the Joint Mathematics Meetings of AMS-MAA-MER, Washington D.C.
13. Cavey, L., T. Barnes, N. Smith, & M. Droujkova. (1999). Mathematical explorations of urban problems. Presentation at the Joint Meeting of School Science and Mathematics and the North Carolina Council of Teachers of Mathematics, Greensboro, NC.

#### Podcasts

1. Barnes, T. (October 2007). STARS Alliance. Computer Science Teachers Association, [http://www.csta.acm.org/Resources/sub/Podcast\\_Files/Tapia/TiffanyBarnesSTARSAllianceUNC.C.mp3](http://www.csta.acm.org/Resources/sub/Podcast_Files/Tapia/TiffanyBarnesSTARSAllianceUNC.C.mp3)
2. Eagle, M., L. Harrison, E. Powell. (October 2007). STARS Alliance. Computer Science Teachers Association, [http://www.csta.acm.org/Resources/sub/Podcast\\_Files/Tapia/MichaelEagleLanceHarrisonEvePowell.mp3](http://www.csta.acm.org/Resources/sub/Podcast_Files/Tapia/MichaelEagleLanceHarrisonEvePowell.mp3)

#### Masters Theses and PhD Dissertations, Committee Chair

1. Stamper, John. (December 2009). Automatic generation of intelligent tutoring capabilities via educational data mining, UNC Charlotte PhD Dissertation, Defense passed August 2009.
2. Amanda Chaffin. (May 2009). Game2Learn: Building a compiler into a game engine to increase learning gains in computer science students, UNC Charlotte Master's Thesis.

#### **INVITED TALKS AND PRESENTATIONS**

1. Tiffany Barnes, Anne McLaughlin, Amos Zeeberg, James Bower, Lucy Bradshaw (March 2010). With great power comes great responsibility: The future of video games. South by Southwest (SXSW2010) Interactive panel, Austin, TX, March 12, 2010.
2. Barnes, T. (October 2009). Game2Learn: Creating and evaluating educational games for computing. Invited speaker for the 25<sup>th</sup> Annual Eastern Conference of the Consortium for Computing in Small Colleges, Villanova, PA, October 31, 2009.
3. Barnes, T. (July 2007). Improving CS Education through Games and Artificial Intelligence & Broadening Participation in Computing. Invited talk at NIU.
4. Barnes, T. (May 2006). Game2Learn: Developing technologies to support and learn about learning. Invited talk for the North Carolina Serious Games Workshop: Collaboration in the N.C. Serious Games Space, Raleigh, NC, May 2, 2006. <http://cde.ncsu.edu/collab-program.html>
5. Young, M., J., Austin, T. Barnes, J. Heneghan, M. Rein. (May 2006). Panel on Serious Games & Serious Game Research Exposition, Center for Entrepreneurial Development's 'Game Night', Research Triangle Park, NC, May 17, 2006.
6. Barnes, T. (July 2005). Technology in education: Data mining, distance education, and gaming to learn. Invited talk for the Pittsburgh Science of Learning Center Seminar, held at Carnegie

Mellon University, Pittsburgh, PA, July 7, 2005.

7. Barnes, T. (May 2005). Gender differences in communication styles. Invited talk for the North Carolina Technology Association's Women in Science and Engineering (WISE) Professional Society, Durham, NC, May 18, 2005.
8. Barnes, T. (April 2005). Technology in education. Invited presentation to the National Academies' Board on Higher Education and Workforce meeting on the use of technology in science and engineering (S&E) education. Washington, DC. April 22, 2005.

## **PROFESSIONAL ACTIVITIES**

### Editorial Work

- Guest Editor: IEEE Computing Now March 2009
- Guest Editor: IEEE Computer Graphics & Applications Special Issue on Serious Games 2009
- Associate Editor: International Journal of Educational Data Mining, 2008-Present

### Organization of International Conferences and Workshops

- Program Track Chair: ACM Intl. Conference on Foundations of Digital Games 2009
- Program Chair: 2<sup>nd</sup> Intl. Conference on Educational Data Mining 2009
- General Conference Chair: 1<sup>st</sup> Intl. Conference on Educational Data Mining, June 2008
- Steering Committee: Educational Data Mining Conference, 2008-Present
- Co-Chair: Educational Data Mining Workshop (AIED 2008)
- Co-Chair: Educational Data Mining Workshop (AAAI 2006)
- Steering Committee: 3<sup>rd</sup> Annual ACM Game Development in Computer Science Education, 2008
- Organizing Committee: STARS Celebration Conference 2006-2009

### Program Committee Membership

- ACM Intl. Conference on Foundations of Digital Games 2010
- Intl. Conference on Intelligent Tutoring Systems 2010
- 3<sup>rd</sup> Intl. Conference on Educational Data Mining 2010
- Educational Data Mining Workshop (AAAI 2005).
- 2<sup>nd</sup> Annual Academic Days on Game Development in Computer Science Education 2007
- Intl. Conf. of the Florida Artificial Intelligence Research Society (FLAIRS 2007, 2009, 2010)
- 45th ACM Southeast Conference (ACMSE 2007)

### Journal & Book Chapter Reviewing

- Presence 2010
- Intl. Journal of Human-Computer Studies 2010
- Handbook of Educational Data Mining, 2009
- IEEE Computational Intelligence and AI in Games, 2009
- Applied Psychological Measurement 2008, 2009, 2010
- IEEE Computer, BPC column, 2008
- Psychometrika 2007
- IEEE Systems, Man, and Cybernetics, 2008
- Intl Journal Learning Technology, 2008
- Journal of Game Development, Jan 2007
- Journal of Computer Programming, Aug 2006
- Communications of the ACM, 2006
- Journal of Intelligent Information Systems, 2005, 2006, 2009
- IEEE Engineering in Medicine & Biology Magazine Special Issue on Bioinformatics 2005

### Conference Reviewing

- AIED 2007, EDM 2008, EDM 2009, EDM 2010
- ACM CHI 2007, ACMSE 2007, ACM SIGCSE 2006-2010, ACM ITiCSE 2009, 2010
- Grace Hopper Celebration of Women in Computing 2006, 2009
- FLAIRS 2007-2010
- GDCSE 2007, ACM GDCSE 2008, & ACM Foundations of Digital Games 2009-2010

#### Research Program Reviewer

- National Science Foundation, Feb 2010, July 2008, March 2008, July 2006, June 2005

#### Professional Leadership and Affiliations

- ACM SIGCSE Board At-Large Member June 2010-Present
- IEEE, ACM, AIED; Past: IASTED, AACE

#### Advisory Boards

- 2009-2010 College Board – New Advanced Placement Course in Computer Science Principles

### TEACHING

#### Teaching Honors and Awards

- UNC Charlotte CCI “**Essam El-Kwae Undergraduate Research Mentor**” Award 2009-2010
- UNC Charlotte CCI “**Excellence in Undergraduate Teaching**” Awards 2008-2009 & 2007-2008
- Nominated for Bank of America Award for Teaching Excellence, UNC Charlotte, November 2008
- UNC Charlotte CCI “**Essam El-Kwae Undergraduate Research Mentor**” Award 2006-2007
- UNC Charlotte Summer Diversity Institute Invited Speaker 2006, Scholarship awardee 2005
- NCSU UGSA Outstanding Teaching Assistant Award (1999)
- NCSU Preparing the Professoriate Award Winner (1998-1999): This competitive program selected 10 students university-wide to receive a stipend and participate in teaching effectiveness workshops and mentored teaching experiences.
- NCSU Hewlett Initiative Graduate Fellow (1997-1999): This competitive program selected 20 graduate students to develop strategies for instituting active learning practices at NCSU. I was co-leader of the Pedagogy group, who developed an active learning student handbook.

#### Curricular Development

- Undergraduate & Graduate Certificates in Game Design & Development
- 5 Graduate & 3 Undergraduate Courses Developed/In Development
  - ITCS 4010/5010 Serious Game Evaluation & Dev. First offer: Fall 2009
  - ITCS 8159 Intelligent Tutoring Systems Approved May 2007
  - ITCS 6159 Intelligent Tutoring Systems Approved May 2007
  - ITCS 4230 Intro. to Game Design & Development Approved May 2006
  - ITCS 5230 Intro. to Game Design & Development Approved May 2006
  - ITCS 4231 Advanced Game Design & Development Approved May 2006
  - ITCS 5231 Advanced Game Design & Development Approved May 2006
- Online Course Development:
  - ITCS 2175 Online Logic & Algorithms First offer: Spring 2008
  - NCSU/CSC Distance Ed. Applied Discrete Mathematics Developed: Spring 2002

#### Courses Taught

- ITCS 4010/5010 Serious Game Evaluation & Dev. F09 (33 students)
- ITCS 4231/5231 Adv. Game Design & Development F10 (40), S09 (18)
- ITCS 2175 Logic and Algorithms F09 (83), S09 (60), S08 (34), F07 (52), F06 (6)
- ITCS 4230/5230 Intro. Game Design & Development F08 (36), F06 (8), F05 (6), S05 (42)

- ITCS 6159/8159 Intelligent Tutoring Systems F07 (6), S06 (6), F04 (6)
- CICS1214 Introduction to Computer Science S07 (38)
- Video Game Design Workshops @ UNCC for Hallym University, Summers 2005, 2006, 2008
- NCSU Distance Education Applied Discrete Mathematics, each Spring, Summer, Fall 2002-2007.

## **UNIVERSITY & COMMUNITY SERVICE**

### UNC Charlotte Departmental Committees

1. Chair, Computer Science Undergraduate Committee, Fall 2010-Present
2. Member, Computer Science Full Professor Recruiting Committee, Spring 2010-Present
3. Chair, Computer Science Awards Committee, Fall 2006-Fall 2009
4. Computer Science Peer review of teaching committee, Fall 2007-Spring 2008.
5. Chair, Computer Science Faculty Search Committee, Fall 2005-Spring 2006
  - Successfully recruited and hired 4 new faculty members. Responsible for recruiting all six top candidates invited for interviews. Two gaming professors learned of UNC Charlotte search through meeting me at the 2006 Microsoft Academic Days on Gaming (1 personally invited to apply). 1 Educational Data Mining candidate from CMU personally invited to apply. 3 remaining candidates recruited through Juan Gilbert, who I recruited to join the STARS Alliance previously. Conducted all phone interviews as pre-selection of interview candidates.
6. Bioinformatics Faculty Search Committee (Fall 2004-Spring 2005)
7. Bioinformatics Curriculum Development Committee (Fall 2004-Spring 2005)

### UNC Charlotte College of Computing & Informatics Committees, Centers & Institutes

1. ACM Peer Tutoring Program Director (2010-Present)
2. Education Strategy Committee (2010-Present)
3. College Strategic Planning (2009-Present)
4. Visualization Center (2005-Present)
5. Diversity in Information Technology Institute (2004-Present)
6. Chair, College Retreat Followup Recommendations Committee (Spring 2005)
7. Diversity Committee (2004- 2006)
8. Marketing Committee (2004-2005)
9. Parliamentarian for College Faculty Meetings, (2005-2006).

### UNC Charlotte Student Organization Advising

1. Gamer's Alliance (2006-Present)
2. ACM-Women (2007-Present)
3. 49er Social and Ballroom Dance Club ([charlottedancesport.org](http://charlottedancesport.org)) (2005-Present)

### North Carolina State University Service (1997-2004)

1. Computer Science Departmental ABET/CAC Accreditation Coordinator - 2004
2. Computer Science Graduate Student Association (President:1999-2002, Member: 2002-2003)
3. Founder: Computer Science Graduate Student Speaker Series (1999-2001)
4. Dancing with Wolves Ballroom Club (Member 1995-2004, President: 1997-2001, Coach: 2001-2004, Webmaster: 1997-2003)
5. Women and Mathematics Mentor (1998-2001,2003-2004)
6. Women in Computer Science Founding Member (2003-2004)

### Community Service and Outreach (a sample)

1. UNC Charlotte High School Summer Camp 2009 "Apsire! IT", 1 week
2. UNC Charlotte Middle School Summer Camp 2009 "IT: Exploring Math & Technology through Culture & Art", 1 week

3. Established & Advising New Peer Outreach STARS Leadership Team, Fall 2009
  - Assisted with Peer-Led Team Learning for ITCS 1215
  - Established mentoring program for CS undergraduates
4. GameCATS STARS Leadership Team advisor
  - Citizen Schools 10-week Game Development after school program, grades 6-8, 2009-Present.
  - Outreach on game development and careers, Fall 2007- present (Including: Berry Academy & Kannapolis Middle School Career Days 2008, Microsoft career day at UNCC 2009)
  - Outreach using Culturally Situated Design Tools, Fall 2007-Fall 2009 (Including: Kannapolis Middle School, ImaginOn, Charlotte After School Enrichment Program).
5. Technical Director, “Girls on Track” Middle School Summer Camp, Raleigh, Summers 2005-6.
6. Game Lab Demonstrations, 2-3 monthly for K-12 and higher visitors since Fall 2007.