Zachary O. Dugas Toups – Curriculum Vitae

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Digital game play represents the human-computer interface in its purest form; one of the primary reasons to play games is to engage their mechanics, which are directly tied to the information presented to the player and the player's means of acting upon said information. My research develops meaningful gameplay experiences through which participants practice skills they will need in real-life, with an emphasis on disaster-response contexts. My work incorporates ethnographic approaches to understanding existing practice; zero-fidelity simulations that capture abstract, human-centered aspects of practice; mixed reality computing that engages players in human-human, human-environment, and human-computer interaction; and mobile, collaborative technologies that support sensemaking for disaster responders.

EDUCATION

Texas A&M University – *Ph.D. Computer Science*

College Station, Texas, USA — Aug 2004–Aug 2010

- dissertation: *Non-Mimetic Simulation Games: Teaching Team Coordination from a Grounding in Practice*
- committee: Andruid Kerne (advisor), Richard Furuta, Charles Samuelson, Scott Schaefer
- 4.0 GPA
- Graduate Assistance in Areas National Need Fellowship recipient (support for five years; $100,000+)
- Houston Advanced Research Center Summer Scholar, two years (3 months / year; $5,200)

Southwestern University – *B.A. Computer Science, Mathematics minor*

Georgetown, Texas, USA — Aug 1999–May 2003

- President's Scholarship (four years; $40,000)
- 3.6 GPA; graduated *cum laude*; Dean's List, 6 semesters
- studied Japanese language and culture in the Asian Studies Program at Kansai University of Foreign Language Studies

RESEARCH

TEEX Disaster Preparedness & Response, Crisis Response Innovative Technologies Lab – *Games and Interaction Assistant Research Engineer*

College Station, Texas, USA — Jun 2011–present

Texas A&M University, Dept. Computer Science & Engineering – *TEES Assistant Research Professor*

College Station, Texas, USA — Jul 2011–present

- supervisors: J. Robert McKee, James A. Wall
- investigating and deploying games for emergency response education and information technology for disaster coordination

Texas A&M University, Interface Ecology Lab – *Postdoctoral Research Associate*

College Station, Texas, USA — Aug 2010–May 2011

- supervisor: Andruid Kerne
- developed zero-fidelity simulation games for team coordination education

Yahoo! Research, Microeconomics & Social Systems – *Research Intern*

Santa Clara, California, USA — Jun–Aug 2009

- supervisor: Elizabeth Churchill
- developed mobile, social systems supporting shopping and wayfinding based on fieldwork with shoppers and concierges

JOURNAL ARTICLE

1. **TOUPS, Z. O.**, KERNE, A., HAMILTON, W. A. The Team Coordination Game: A zero-fidelity simulation abstracted from fire emergency response practice. *ACM Transactions on Computer-Human Interaction 18*, 4, Article 23 (Dec. 2011). 23:1–23:37.

ARCHIVAL PUBLICATIONS

2. KERNE, A., HAMILTON, W., **TOUPS, Z. O.** Culturally based design: Embodying trans-surface information exchange in Rummy. *Proc. ACM Conf. on Computer Supported Cooperative Work* (2012). In press.
3. **TOUPS, Z. O.**, KERNE, A., HAMILTON, W. A., SHAHZAD, N. Zero-fidelity simulation of fire emergency response: Improving team coordination learning. *Proc. ACM SIGCHI Int'l Conf. on Human Factors in Computing Systems* (2011), 1959–1968. [400/1540, 26%]
4. **TOUPS, Z. O.**, KERNE, A., HAMILTON, W. Designing core mechanics and interfaces for engaging cooperative play: Non-mimetic simulation of fire emergency response. *Proc. ACM SIGGRAPH Symp. on Video Games* (2009), 71–78. [30%]
5. **TOUPS, Z. O.**, KERNE, A., HAMILTON, W., BLEVINS, A. Emergent team coordination: From fire emergency response practice to a non-mimetic simulation game. *Proc. ACM Int'l Conf. on Supporting Group Work* (2009), 341–350. [40/110, 36%]
6. HAMILTON, W., **TOUPS, Z. O.**, KERNE, A. Synchronized communication and coordinated views: Qualitative data discovery for team game user studies. *Ext. Abs. ACM SIGCHI Int'l Conf. on Human Factors in Computing Systems* (2009), 4573–4578.
7. KERNE, A., **TOUPS, Z. O.**, DWORACZYK, B., KHANDELWAL, M. A concise XML binding framework facilitates practical object-oriented document engineering. *Proc. ACM Symp. on Document Engineering* (2008), 62–65. [21/62, 34%]
8. **TOUPS, Z. O.**, KERNE, A. Implicit coordination in firefighting practice: Design implications for training fire emergency responders. *Proc. ACM SIGCHI Int'l Conf. on Human Factors in Computing Systems* (2007), 707–716. [142/571, 25%]
9. **TOUPS, Z. O.**, GRAEBER, R., KERNE, A., TASSINARY, L., BERRY, S., OVERBY, K., JOHNSON, M. A design for using physiological signals to affect team game play. *Foundations of Augmented Cognition* (2006), 134–139.
10. ALEY, E., COOPER, T., GRAEBER, R., KERNE, A., OVERBY, K., **TOUPS, Z. O.** Censor Chair: Exploring censorship and social presence through psychophysiological sensing. *Proc. ACM Int'l Conf. on Multimedia* (2005), 922–929. [49/312, 16%]
11. **TOUPS, Z. O.**, KERNE, A., CARUSO, D., DEVOY, E., GRAEBER, R., OVERBY, K. Rogue Signals: A location-aware game for studying the social effects of information bottlenecks. *Ext. Abs. Ubicomp* (2005).

PUBLICATIONS

12. **TOUPS, Z. O.**, HAMILTON, W. A., KERNE, A. Zero-fidelity simulation: Engaging team coordination without physical, functional, or psychological re-creation. *Proc. MODSIM World* (2011), in press.
13. **TOUPS, Z. O.**, KERNE, A., HAMILTON, W. Motivating play through score. *Workshop on Engagement by Design*. ACM SIGCHI Int'l Conf. on Human Factors in Computing Systems (2009).
14. **TOUPS, Z. O.**, KERNE, A. *Making invisible*: Communication as core mechanic in non-mimetic simulation games. *The Future of Interactive Media: Workshop on Media Arts, Science, and Technology* (2009).
15. **TOUPS, Z. O.** Teaching team coordination through location-aware non-mimetic simulation games. *Doctoral Consortium*, ACM Conf. on Computer Supported Cooperative Work (2008). [44%]
16. **TOUPS, Z. O.**, KERNE, A. Location-aware augmented reality gaming for emergency response education: Concepts and development. *Workshop on Mobile Spatial Interaction*, 70–73. ACM SIGCHI Int'l Conf. on Human Factors in Computing Systems (2007).

PROGRAM COMMITTEES

ACM SIGCHI Conference on Human Factors in Computing Systems – *associate chair, Design Papers Subcommittee* 2012, 2011

ACM SIGCHI Conference on Human Factors in Computing Systems – *program committee, Works in Progress* 2012, 2011

Texas Games & Virtual Environments Symposium – *founding co-program chair* 2010

International Community on Information Systems for Crisis Response and Management, special session on human computer interaction design for emergency systems – *program committee* 2009

Journal of Personal and Ubiquitous Computing, special issue on player experiences in location aware games – *editorial committee* 2009

Human Computer Interaction 2008, workshop on measuring player experience in location-aware games – *program committee* 2008

GRANT WRITING

co-develop funded proposals with advisor to NSF-CISE including research objectives, research plans, and literature reviews.

- IIS-0803854 HCC – Medium: A Location-Aware Non-Mimetic Simulation Game for Teaching Team Coordination ($507,806, Aug 2008–Aug 2012)
- IIS-0742947 SGER: Non-Mimetic Simulation of Fire Emergency Response Team Cognition Stress through a Mixed Reality Game ($96,893, Sep 2007–Feb 2010)

RESEARCH PROJECTS

Team Coordination Game (TeC)

designs zero-fidelity, non-mimetic simulation games from ethnographic investigation of fire emergency response work practice that leverage embodied interaction to teach team coordination skills.

- performing *ethnographic fieldwork* of fire emergency response work and teaching practice, resulting in design implications for non-mimetic, zero-fidelity simulations [5, 8, 16].
- designing and developing *location-aware team game designs* for teaching team coordination skills [4, 5, 11, 12, 13]. Uses *particle simulation*, *choreography*, and *flocking*. Real-time networked performance. Implementation in Java, Pure Data, and OSC.
- evaluating game designs by *analyzing player communications*, *devising audio coding schemes*, *analyzing player performance from logs* to *discover qualitative instances of team coordination* [1, 2, 4, 5, 6].
- designing and developing *hardware architecture* for *mixed reality wearable systems*, including printed circuits designed using OrCAD and a backpack computer platform developed with Mystery Ranch pack designers.
- extending developed game designs that *measure psychophysiological indicators of stress* in participants and use it as part of the game [9]. Implementation in Java, C++, and OSC.
- supervising project collaborators, including two graduate students and one undergraduate.

Mobile Social Systems Supporting Shopping, Searching, and Wayfinding

designs mobile applications for supporting shopping and wayfinding based on ethnographic investigation of shoppers and concierges using context-aware, location-based search.

- develop mobile web and iPhone applications that leverage context to search and bound results, supporting shopping and wayfinding, based on the ways shoppers gather and share information.
- support social search by providing contextually relevant messages that can easily be shared with a social network.

Support for Information Mapping in Programming Languages (S.IM.PL) Frameworks

layered frameworks exemplify object-oriented programming and code reuse, creating foundation code upon which applications are developed.

- designing and developing the S.IM.PL Serialization information-binding framework [7], that uses in-code metalanguage declarations to indicate information semantics from class structures promoting object-oriented design.
- designing and developing *Object-Oriented Distributed Semantic Services* (OODSS), a message-passing system that layers over S.IM.PL Serialization for *high-performance networked applications* where *information semantics and behaviors* are intimately linked in code.
- designing and developing *location-aware libraries* for integrating and storing information about *location and wireless networks* in Java applications as well as serving data to Google Earth.
- designing and developing *Interaction Logging Services*, program instrumentation that records user interaction and system state through a combination of local memory-mapped files and remote servers layered over the OODSS.
- designing and developing the *Studies Framework*, *easily deployed* servlets that *elicit user feedback* through counter-balanced web studies. Studies utilize Java Web Start, serving JNLP applications with *custom preferences based on user responses in the study*.

TEACHING EXPERIENCE

Senior Capstone Software Design (CSCE 482) – *senior lecturer*

Computer Science & Engineering Dept., Texas A&M University, College Station, Texas, USA spring 2012

- curriculum design – project topics, readings, and deliverables centered around gaming, augmented reality, multi-surface collaboration, and disaster response
- incorporates a project menu, from which students select projects and compete for them through proposal-writing
- students learn to communicate through written word, demonstration, presentation, and video

Computer-Human Interaction (CSCE 436) – *assistant senior lecturer*

Computer Science & Engineering Dept., Texas A&M University, College Station, Texas, USA fall 2011

- teach students about human-centered design
- develop video-based projects for students to learn to present their work using video as a medium

Senior Capstone Software Design (CSCE 482) – *assistant senior lecturer*

Computer Science & Engineering Dept., Texas A&M University, College Station, Texas, USA fall 2011

- curriculum design – project topics, readings, and deliverables centered around augmented reality and multi-surface collaboration in disaster response
- project topics incorporated disaster response projects with real-world constituencies

Introduction to Program Design and Concepts (CSCE 121) – *lecturer*

Computer Science & Engineering Dept., Texas A&M University, College Station, Texas, USA spring 2011

- educate computer science students in solving problems and designing programs
- engage students in the design and development of a large scale game program with a constrained scope to teach interaction design, file I/O, and other learning objectives
- engage students in processes of communication through written reports and demo presentations
- uses the C++ programming language

Human Centered Systems and Information (CSCE 655) – *teaching assistant, guest lecturer*

Computer Science & Engineering Dept., Texas A&M University, College Station, Texas, USA fall 2010, fall 2009, fall 2008, fall 2007

- curriculum design – student interface design projects, including project specification and developing libraries
- course lectures – location technologies, XML, S.IM.PL, OODSS, location-aware systems, analysis techniques
- evaluate student presentation on affordances and constraints in interactive artifacts

Location, Location, Location (CSCE 689) – *teaching assistant*

Computer Science & Engineering Dept., Texas A&M University, College Station, Texas, USA spring 2008

- curriculum design – lecture topics and readings

Senior Capstone Software Design (CSCE 482) – *project mentor*

Computer Science & Engineering Dept., Texas A&M University, College Station, Texas, USA fall 2010, spring 2010

- curriculum design – project topics, readings, and deliverables centered around game design and public/private interaction with large displays

Introduction to Computer Science Concepts and Programming (CSCE 111) – *teaching assistant*

Computer Science & Engineering Dept., Texas A&M University, College Station, Texas, USA fall 2006

- teach Java and object-oriented programming skills
- evaluate student projects and exams

Japan Exchange Teaching Programme – *assistant English teacher*

Toyota/Kamo Regional Education Office (豊田加茂教育事務所), Toyota City, Aichi, Japan fall 2003–summer 2004

- English and cultural exchange teacher for 15 elementary and junior high schools

INVITED TALKS

The Team Coordination Game: A zero-fidelity simulation abstracted from fire emergency response practice [upcoming]
ToCHI Talk. ACM SIGCHI '12 Conference on Human Factors in Computing Systems, Austin, TX, USA. May 2012

Augmented reality for disaster response [upcoming]
3rd Annual Midwest Disasters 2.0 Conference, Kansas City, KS, USA. Feb 2012

Immersive interactive visualization: Improving memory through game play
Future vision faculty candidate talk, Texas A&M University, College Station, TX, USA. Mar 2011

Meaning through play: Zero-fidelity simulation, the Team Coordination Game, & mixed reality
Creative and scholarly work faculty candidate talk, Texas A&M University, College Station, TX, USA. Mar 2011

Making meaning through play: Zero-fidelity simulation, the Team Coordination Game, and mixed reality
Faculty candidate talk, Utah State University, Logan, UT, USA. Mar 2011

TALKS

Zero-fidelity simulation: Engaging team coordination without physical, functional, or psychological re-creation
Serious Games and Virtual Worlds Track, MODSIM World, Virginia Beach, VA, USA. Oct 2011

Zero-fidelity simulation of fire emergency response: Improving team coordination learning
Emergency Response & Scheduling Session, ACM SIGCHI '11 Conference on Human Factors in Computing Systems, Vancouver, BC, Canada. May 2011

Zero-fidelity simulation of fire emergency response: Measuring the impact on team coordination learning
Visiting talk, Fraunhofer FIT, Sankt Augustin, Germany. Nov 2010

Non-mimetic simulation games: Teaching team coordination from a grounding in practice
Ph.D. defense, Texas A&M University, College Station, TX, USA. Jun 2010

Teaching team coordination to fire emergency responders with non-mimetic simulation games
Texas Games & Virtual Environments Symposium, College Station, TX, USA. May 2010

Game design principles for engaging cooperative play: Core mechanics and interfaces for non-mimetic simulation of fire emergency response
TAMU MobSoc: Mobile Applications, Social Media, College Station, TX, USA. Feb 2010

Game design principles for engaging cooperative play: Core mechanics and interfaces for non-mimetic simulation of fire emergency response
Game Mechanics and Design Projects Session. SIGGRAPH '09 Special Interest Group on Computer Graphics and Interactive Techniques Conference, New Orleans, LA, USA. Aug 2009

Emergent team coordination: From fire emergency response practice to a non-mimetic simulation game
Empirical-Qualitative Experience Session. GROUP '09 ACM 2009 International Conference on Supporting Group Work, Sanibel Island, FL, USA. May 2009

Motivating play through score
Workshop on Engagement by Design. CHI '09 CHI Conference on Human Factors in Computing Systems, Boston, MA, USA. Apr 2009

Game design principles for engaging cooperative play
Houston Serious Games Research Consortium, Houston, TX, USA. Mar 2009

Making invisible
Poster. Texas A&M University Student Research Week, College Station, TX, USA. Mar 2009

Making invisible: Communication as core mechanic in non-mimetic simulation games
Poster. The Future of Interactive Media: Workshop on Media Arts, Science, and Technology, Santa Barbara, CA, USA. Jan 2009

Teaching team coordination through location-aware non-mimetic simulation games
Doctoral Consortium. CSCW '08 Computer Supported Cooperative Work, San Diego, CA, USA. Nov 2008

From ethnography to design: Non-mimetic simulation for team coordination
Training and Research Session. Human Factors and Ergonomics Society Texas Regional Conference, Austin, TX, USA. Apr 2008

Creative and expressive systems
Houston Advanced Research Center Brown Bag Talk, The Woodlands, TX, USA. Mar 2008

Implicit coordination in firefighting practice: Design implications for teaching fire emergency responders
Emergency Action Session. CHI '07 CHI Conference on Human Factors in Computing Systems, San Jose, CA, USA. Apr 2007

Location-aware mixed reality gaming for emergency response education
Poster. Workshop on Mobile Spatial Interaction, ACM SIGCHI '07 Conference on Human Factors in Computing Systems, San Jose, CA, USA. Apr 2007

Implicit coordination in firefighting practice: Design implications for teaching fire emergency responders
Interface Ecology Lab Colloquium, College Station, TX, USA. Apr 2007
Texas A&M University Student Research Week, College Station, TX, USA. Mar 2007

A design for using physiological signals to affect team game play
Augmented Cognition International Conference, San Francisco, CA, USA. Nov 2006

A design for using physiological signals to affect team game play
Interface Ecology Lab Colloquium, College Station, TX, USA. Nov 2006

Censor Chair: Exploring censorship and social presence through psychophysiological sensing
Interactive Arts: Interaction in Social and Virtual Environments Session. 13th Annual ACM International Conference on Multimedia, Singapore. Nov 2005

Rogue Signals: A location-aware game for studying the social effects of information bottlenecks
Poster. 7th International Conference on Ubiquitous Computing, Tokyo, Japan. Aug 2005

REVIEWING

International World Wide Web Conference – Demos	2012
International Conference on Tangible, Embedded and Embodied Interaction	2012
International Symposium on Sketch-Based Interfaces and Modeling	2011
MobileHCI	2011
Elsevier *Interacting with Computers*	2011
ACM Conference on Computer Supported Cooperative Work	2011
International Conference on Tangible and Embedded Interaction	2011
ACM Designing Interactive Systems	2010
ACM SIGCHI Conference on Human Factors in Computing Systems	2010
International Conference on Pervasive Computing	2010
ACM Computer Supported Cooperative Work	2009
ACM Creativity and Cognition	2009
ACM SIGCHI Engineering Interactive Computer Systems	2009
ACM SIGCHI Conference on Human Factors in Computing Systems	2009
PsychNology 6, 2	2008
Mobile Human Computer Interaction	2008
Human Factors and Ergonomics Society Annual Meeting	2008
ACM SIGCHI Conference on Human Factors in Computing Systems	2008
ACM Symposium on User Interface Software and Technology	2008
ACM SIGCHI Conference on Human Factors in Computing Systems	2007

HONORS AND AWARDS

Building Future Faculty Program, North Carolina State – *workshop participant* (travel expenses) Mar 2010

Graduate Assistance in Areas of National Need – *fellowship recipient* (full support, $100,000+) 2004–2009

Consortium for the Science of Socio-Technical Systems – *Summer Research Institute participant* (travel expenses) Jun 2009

ACM Computer Supported Cooperative Work – *doctoral consortium* (travel expenses) Nov 2008

Houston Advanced Research Center Summer Scholars – *scholarship recipient* ($5,200) Jun–Aug 2007

Society for Technical Communication, Austin, Texas Chapter – *student writing award for* [8] May 2007

National Association of Student Personnel Administrators Student Health, Wellness, Counseling – *bronze award for Southwestern University Alcohol Reality Check* Apr 2007

Houston Advanced Research Center Summer Scholars – *scholarship recipient* ($5,200) Jun–Aug 2006

President's Scholar – *scholarship recipient* ($40,000) 1999–2003

Southwestern University – *Dean's List* fall 1999–spring 2000, spring 2001–spring 2002, spring 2003

SERVICE

Texas Junior Regional Science Bowl – *moderator*, *science judge* Mar 2010

Texas Regional Science Bowl – *moderator* Feb 2010

GROUP '09 ACM 2009 International Conference on Supporting Group Work – *student volunteer* May 2009

CHI '09 CHI Conference on Human Factors in Computing Systems – *student volunteer* Apr 2009

ACM SIGGRAPH Conference – *student volunteer* Jul 2002

ORGANIZATIONS

Upsilon Pi Epsilon (computer science honorary) – *member* 2003–present

Pi Mu Epsilon, Texas Pi Chapter (mathematics honorary) – *member* 2002–present

Delta Omicron (music and service honorary) – *member* 2002–present

Association for Computing Machinery – *member* 2000–2004, 2005–present

SU Manga Corps (Japanese animation organization) – *founder, president* 1999–2002

PROFESSIONAL EXPERIENCE

Associated Colleges of the South Technology Center – *Web Developer / Intern*

Georgetown, Texas, USA Jan–Jul 2002, Jan–Jul 2003

- project (below): Course Delivery System
- maintained a lab of Microsoft Windows and Apple Mac OS X computers
- prepared systems running Microsoft Windows XP, Apple Mac OS X, UNIX, and IRIX

Harte-Hanks Response Management – *Support Technician Level II*

Austin, Texas, USA Jan 2000–Jan 2002

- telephone technical support and troubleshooting for major computer hardware vendors
- trained employees in hardware troubleshooting and communication skills
- recognized for outstanding performance

PREVIOUS RESEARCH & PROJECTS

WebSets

a World Wide Web browser enhancement that provides a *set-based graphical model* of navigation opportunities from a web page *based on destination content* that can be re-partitioned by user preference. Implementation in Java.

iWebSets

an intelligent interface to WebSets. Provides the user with a graphical interface to link sets with options for *clustering and suggesting partition terms based on link destination content*. Implementation in Java.

Censor Chair

an art-science installation using *psychophysiological measures* and *video tracking* to *transform media* playing within the space, designed to provoke thought about censorship [10]. Developed in Max/MSP/Jitter.

Associated Colleges of the South Course Delivery System

open-source web team-teaching tool. Supports real-time classroom chat with streamed lectures, online testing and assignments, and many other features. Design and implementation. Developed in PHP, JavaScript, and MySQL.

SU Alcohol Reality Check

an *award-winning online alcohol education system* for students involved in alcohol-related offences. Built for the Southwestern University Counseling Services. Design, implementation, server setup. Developed in PHP and MySQL.