Zachary Oliver Dugas Toups

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RESEARCH

ethnographic approaches, digital games, interface design, location-aware computing, non-mimetic simulation, team coordination, wearable computers, mixed reality, signal processing, psychophysiological sensing.

Teaching Team Coordination through Location-aware Games (T^2eCLoG)

Interface Ecology Lab, Texas A&M University December 2004 – present

designs 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 simulations [Toups, Kerne 2007a; 2007b].
- designing and developing *location-aware team game designs* for teaching team coordination skills [Toups et al. 2005; Toups, Kerne, Hamilton 2009a; Toups, Kerne, Hamilton 2010]. 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* [Toups, Kerne, et al. 2009; Toups, Kerne, Hamilton 2009a, 2009b; Hamilton, Toups, Kerne 2009].
- designing and developing *hardware architecture* for *mixed-reality wearable systems*, including printed circuits designed using OrCAD.
- extending developed game designs that *measure psychophysiological indicators of stress* in participants and use it as part of the game [Toups, Kerne, et al. 2006]. Implementation in Java, C++, and OSC.
- supervising project collaborators, including two graduate students and two undergraduate.

Mobile Social Systems Supporting Shopping, Searching, and Wayfinding

Internet Experiences Group, Microeconomics & Social Systems, Yahoo! Research June 2009 – August 2009

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.

Ecologylab Frameworks

Interface Ecology Lab, Texas A&M University July 2004 – present

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

- designing and developing the `ecologylab.xml` information binding framework [Kerne, Toups, et al. 2008], 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 `ecologylab.xml` for *high-performance networked applications* where *information semantics and behaviors* are intimately linked in code [Toups, Hamilton, et al. 2010].
- 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*.

Grant writing

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

PUBLICATIONS – ARCHIVAL

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 Symposium on Video Games* (2009), 71–78. [30%]

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 Group* (2009), 341–350. [40/110, 36%]

HAMILTON, W., TOUPS, Z. O., KERNE, A. Synchronized communication and coordinated views: Qualitative data discovery for team game user studies. *Ext. Abs. ACM Computer Human Interaction* (2009), 4573–4578.

KERNE, A., TOUPS, Z. O., DWORACZYK, B., KHANDELWAL, M. A concise XML binding framework facilitates practical object-oriented document engineering. *Proc. ACM Document Engineering* (2008), 62–65. [21/62, 34%]

TOUPS, Z. O., KERNE, A. Implicit coordination in firefighting practice: Design implications for training fire emergency responders. *Proc. ACM Computer Human Interaction* (2007), 707–716. [142/571, 25%]

TOUPS, Z. O., KERNE, A., GRAEBER, R., JOHNSON, M., OVERBY, K., BERRY, S. A design for using physiological signals to affect team game play. *Foundations of Augmented Cognition* (2006), 134–139.

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 Multimedia* (2005), 922–929. [49/312, 16%]

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

TOUPS, Z. O., KERNE, A., HAMILTON, W. Motivating play through score. *Workshop on Engagement by Design*. ACM Computer Human Interaction (2009).

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).

TOUPS, Z. O. Teaching team coordination through location-aware non-mimetic simulation games. *Doctoral Consortium*, ACM Computer Supported Cooperative Work (2008). [44%]

TOUPS, Z. O., KERNE, A. Location-aware augmented reality gaming for emergency response education: Concepts and development. *Workshop on Mobile Spatial Interaction Whitepaper*, 70-73. ACM Computer Human Interaction (2007).

IN REVIEW

TOUPS, Z. O., KERNE, A., HAMILTON, W. A. You can't open white doors, but you can kick down red ones: Augmenting *affordances-as-signs* to represent game mechanics. *ACM Designing Interactive Systems* (2010). In review.

TOUPS, Z. O., HAMILTON, W. A., KERNE, A., SHAHZAD, N. S.IM.PLifying Information-Centric Distributed Object-Oriented Software Development. *ACM Systems, Programming, Languages, and Applications: Software for Humanity, OOPSLA Research Papers* (2010). In review.

EDUCATION AND RESEARCH

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

College Station, Texas, USA August 2004 – August 2010 (expected)

- dissertation research: *Non-Mimetic Simulation Games: Teaching Team Coordination from a Grounding in Practice*
- advisor: Andruid Kerne, Ph.D.
- overall GPA 4.0
- Graduate Assistance in Areas National Need Fellowship recipient (support for five years; $100,000+)
- Ecologylab Frameworks
- NSF-CISE grant proposal co-author
- Houston Advanced Research Center Summer Scholar, two years (3 months / year; $5,200)
- teaching assistant for courses on human-centered design, location-aware systems, and introductory programming
- courses on human-centered design, location-aware systems, physical interfaces, physically based modeling, intelligent user interfaces, hypertext, artificial intelligence, team performance
- previous research (below): iWebSets, WebSets, and Censor Chair

Yahoo! Research – *Research Intern*

Santa Clara, California, USA June 2009 – August 2009

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

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

Georgetown, Texas, USA August 1999 – May 2003

- graduated *cum laude*
- overall GPA 3.7, computer science GPA 3.7
- Dean's List, six semesters
- President's Scholarship (four years; $40,000)
- project (below): SU Alcohol Reality Check
- founded SU Manga Corps

Kansai University of Foreign Language Studies (関西外国語大学)

Hirakata City, Osaka Prefecture, Japan August 2002 – December 2002

- studied Japanese language and culture in the Asian Studies Program

TEACHING EXPERIENCE

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

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

- curriculum design – student interface design projects, including project specification and developing libraries
- course lectures – location technologies, XML, `ecologylab.xml`, OODSS, location-aware systems
- evaluate student presentation on affordances and constraints in interactive artifacts

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

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

- curriculum design – lecture topics and readings

Senior Capstone Software Design (CSCE 482) – *teaching assistant*

Computer Science and Engineering Dept., Texas A&M University, College Station, Texas, USA 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*

Department of Computer Science and Engineering, 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, spring 2004, summer 2004

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

PRESENTATIONS

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

Game design principles for engaging cooperative play: Core mechanics and interfaces for non-mimetic simulation of fire emergency response — August 2009
Game Mechanics and Design Projects Session. ACM 2009 SIGGRAPH Symposium on Video Games, New Orleans, Louisiana, USA.

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

Motivating play through score — April 2009
Workshop on Engagement by Design. ACM 27th International Conference on Human Factors in Computing Systems, Boston, Massachusetts, USA.

Game design principles for engaging cooperative play — March 2009
Houston Serious Games Research Consortium, Houston, Texas, USA.

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

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

Teaching team coordination through location-aware non-mimetic simulation games — November 2008
Doctoral Consortium. ACM 2008 Conference on Computer Supported Cooperative Work, San Diego, California, USA.

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

Creative and expressive systems — March 2008
Houston Advanced Research Center Brown Bag Talk, The Woodlands, Texas, USA.

Implicit coordination in firefighting practice: Design implications for teaching fire emergency responders — April 2007
Emergency Action Session. ACM SIGCHI Conference on Human Factors in Computing Systems 2007, San Jose, California, USA.

Location-aware mixed reality gaming for emergency response education — April 2007
Poster. Workshop on Mobile Spatial Interaction, ACM Computer Human Interaction 2007, San Jose, California, USA.

Implicit coordination in firefighting practice: Design implications for teaching fire emergency responders — April 2007
Interface Ecology Lab Colloquium, College Station, Texas, USA.

Implicit coordination in firefighting practice: Design implications for teaching fire emergency responders — March 2007
Texas A&M University Student Research Week, College Station, Texas, USA.

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

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

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

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

REVIEWING

Serious Games and Virtual Environments Day at Texas A&M University – *program committee*, *organizer* 2010
ACM Designing Interactive Systems – *reviewer* 2010
ACM Computer Human Interaction Conference – *reviewer* 2010
Pervasive – *reviewer* 2010
ACM Computer Supported Cooperative Work – *reviewer* 2009
ACM Creativity and Cognition – *reviewer* 2009
International Community on Information Systems for Crisis Response and Management, special session on human computer interaction design for emergency systems – *program committee* 2009
ACM Engineering Interactive Computer Systems – *reviewer* 2009
ACM Computer Human Interaction Conference – *reviewer* 2009
Journal of Personal and Ubiquitous Computing, special issue on player experiences in location aware games – *editorial committee* 2009
PsychNology 6, 2 – *reviewer* 2008
Mobile Human Computer Interaction – *reviewer* 2008
Human Factors and Ergonomics Society Annual Meeting – *reviewer* 2008
ACM Computer Human Interaction Conference – *reviewer* 2008
ACM Symposium on User Interface Software and Technology – *reviewer* 2008
Human Computer Interaction 2008, workshop on measuring player experience in location-aware games – *program committee* 2008
ACM Computer Human Interaction Conference – *reviewer* 2007

SERVICE

ACM Group Conference – *student volunteer* May 2009
ACM Computer Human Interaction Conference – *student volunteer* April 2009
ACM SIGGRAPH Conference – *student volunteer* July 2002

HONORS AND AWARDS

Building Future Faculty Program, North Carolina State – *workshop participant* (travel expenses) March 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) June 2009

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

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

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

National Association of Student Personnel Administrators Student Health, Wellness, Counseling – *bronze award for SU Alcohol Reality Check* April 2007

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

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 January 2002 – July 2002, January 2003 – July 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 II*

Austin, Texas, USA January 2000 – January 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 AND 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 [Aley, Cooper, Graeber, Kerne, Overby, Toups 2005]. 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.