Building Values into the Design of Pervasive Mobile Technologies

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Dissertation Proposal
Doctor of Philosophy in Information Studies
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Professor Christine L. Borgman, Chair

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Research Description

Pervasive mobile technologies such as mobile phones are always-on, always-present devices carried by billions. Coordinating such ubiquitous devices could yield an unprecedented platform for gathering data about people, including location, images, motion, and user input. Current computer science and engineering research could enable individuals to use their phones to collect and respond to personal data about their habits, routines, and environment. Networks of phones could become technological platforms for advocacy, helping a community make a case through documentation of a problem or need. New forms of expression may emerge as telecommunications and internet social networking interweave with these sensing capabilities. Or these devices could enable the largest surveillance system on the planet. A host of factors could tip the delicate balance between advocacy and expression or repression and control, including power structures of adoption and use, national and international policy and regulation, and technical affordances embedded during system design.

My thesis explores the benefits and threats of mobile sensing by probing this last factor: design processes and decisions that embed values into an emerging technology. A primary goal of my project is to explore new values concerns engendered by mobile sensing systems. In addition, I probe design processes and design setting structures for possibilities to foreground a specific set of ethics – privacy and anti-surveillance values – into design. Participating in and observing the design of software and architecture to coordinate pervasive sensing systems will enable me to discover design processes that foreground or encourage values debates. Discovering design process influences on values will contribute to a broader understanding the threats and possibilities of mobile sensing. It will also suggest design practices and interventions to shape socially desirable technologies.
Mobile sensing and surveillance

Academic and industry researchers are currently coordinating mobile phone networks for purposes ranging from entertainment to improving public health (Eisenman et al., 2007, 2006; Burke et al., 2006; Khan & Markopoulos, 2009; Miluzzo, Lane, Eisenman, & Campbell, 2007). Technologists and engineers involved in research trajectories labeled mobile sensing, urban or participatory sensing endeavor to make these everyday devices a platform for coordinated investigation of the environment and human activity. Mobile sensing harnesses the power of an existing technology—a distributed, numerous, and ubiquitous network of mobile phones—for social projects and goods. Users might benefit from phone location awareness to understand their exposure to air pollution as they move through a city. Communities could band together to undertake research projects using tools they already own. Teams might use their phones to snap, tag and upload photos of community events, perform volunteer assessments of the pedestrian or bike friendliness of neighborhoods, or improve the ease of reporting environmental threats. Mobile sensing developers draw scenarios from community organizing and environmental justice, and imagine these tools deployed in public interest initiatives. Such powerful, familiar, and plentiful sensors could enable interest groups to make their case through distributed documentation of problems, needs, or community assets.

For example, Your Flowing Data (http://your.flowingdata.com/) is a project that asks users to send short SMS or Twitter messages recording data points (e.g. weight, exercise accomplished, mood, or food eaten) throughout the day. The project then provides users with visualizations to explore patterns among data points and learn from their data. A different implementation is the Personal Environmental Impact Report (PEIR) http://peir.cens.ucla.edu/, a participatory sensing application that uses participants’ mobile phones to record their location every thirty seconds. PEIR
takes this time-location series and infers how much a participant drives each day, and whether she
spends time near polluted highways. PEIR uses this information to give participants a daily profile
of their carbon footprint and exposure to air pollutants.

To accomplish these analytic goals, systems such as Your Flowing Data and PEIR gather,
store and process large amounts of personal information, creating massive databases of individuals’
locations, movements, images, sound clips, text annotations, and even health data. Sharing such data
with application providers may be necessary to analyze results from granular observations. But
applications built in a design culture that encourages maximum data collection and retention,
without consideration for targeting, focus or deletion, risks creating databases ripe for “function
creep”: using amassed personal data for secondary, unforeseen purposes to which data subjects have
not consented (Curry, Phillips, & Regan, 2004). In addition, designers trained in software cultures
where openness is a virtue (Kelty, 2008), or institutions that emphasize data sharing to aid scientific
and engineering innovation (Borgman, 2007), may find these values in conflict with users who wish
to share personal data very selectively. Providing best-practice security to protect this data from theft
or hacking is also difficult in small design laboratories or for projects hosted by individuals.
Developers of such technologies may also have financial motives to mine personal data, producing
targeted advertising, selling valuable behavioral data to third parties, or using location to hone price
or product discrimination (Curry et al., 2004). Finally, with no specific legal protections for
participatory sensing data, comprehensive databases documenting individuals’ movements are prime
targets for subpoena or government surveillance (Phillips, 2003).

Beyond design, adoption and use could also alter optimistic visions of mobile sensing. A
public armed with diverse, powerful sensors could create a future of social exploration and
cooperative data analysis. Or the same tools could encourage vigilantism and a tattletale public.
Without privacy and anti-surveillance safeguards in design and regulation, mobile sensing may join the ranks of existing peer-to-peer surveillance systems such as sex offender databases and online background checks, which encourage users to observe and report on each other (Andrejevic, 2007).

Significance

A multi-year study into a lab at the forefront of mobile sensing development will illustrate the processes, supporting structures and competing tensions during technology design that facilitate or frustrate discussion of, and action on, moral values. Further, through changes in system design and laboratory processes, my project explicitly asks system designers to consider and respond to privacy and anti-surveillance ethics during the process of innovation and development. My research asks not only what values mobile sensing designers espouse, but how interventions—by outside social scientists, mentors and colleagues, clients and research subjects, and institutional authorities—might increase designers’ ability to consider, foreground and react to privacy and anti-surveillance ethics within the constraints of design.

We already live among pervasive surveillance systems. As Lyon says, “Information societies are surveillance societies” (2001, p. 10). The question remains whether we can divert, subvert, or more equitably disperse some of that information power. Understanding when and how ubiquitous sensing engineers weigh social values to make design decisions, and the technological features that result, can reveal the possibilities that mobile sensing holds for avoiding surveillance and providing secure and equitable use, meaningful community participation, and empowerment.

Methods

My thesis will consider empirical data from several years spent as a participant observer in a laboratory at the forefront of the design of mobile sensing technologies (http://urban.cens.ucla.edu/). Participating in the mobile sensing design lab at the Center for
Embedded Networked Sensing (CENS) provides a unique opportunity to study the ways in which designers embed values in software, architecture and practices associated with that technology. Using interviews, document analysis, and participant observation, I will investigate processes that enable or impede ethical decision-making within the mobile sensing design setting. I will also use data from focus groups with system users to contrast understandings of ethics in the lab with concerns expressed by participants in mobile sensing. Finally, my project asks how ethicists and social scientists concerned with the development of this technology can be influential within the design process. I investigate five design processes—the presence of an ethics advocate, faculty mentoring and modeling, engineers as system users, user-designer feedback loops, and interaction with institutional ethical mandates such as IRBs—to evaluate which processes might successfully foreground ethical problems and solutions during the design of pervasive mobile technologies.

Research questions

Through interviews and observation of CENS mobile sensing stakeholders, I will explore the ways in which processes within design encourage discovery, discussion, and incorporation of anti-surveillance values like privacy, consent, equity, limited data retention and data minimization (Marx, 1998). My project will address the following research questions:

1. What values are of primary concern to CENS urban sensing designers, and how do they contrast with values of primary concern to system users?
2. How do system designs materialize or obscure ethics of privacy, consent, equity, and forgetting?
3. What CENS design practices and structures foster values of privacy, consent, equity, limited data retention, and data minimization in CENS participatory sensing projects?
4. What intervention techniques encourage values of privacy, consent, equity, limited data retention, and data minimization as primary design criteria?
Research design

I propose a participant observer approach (Spradley, 1980) to studying the design laboratory for discussion and embedding of values in design of mobile sensing technologies. As a member of the CENS mobile sensing research team, I have excellent access to the design setting, and can participate and systematically analyze all phases of design.

I will investigate these research questions using participant-observation in the CENS mobile sensing laboratory, interviews with laboratory members, and analysis of presentations, papers, and technologies produced by the design team. Observation and interviews can reveal how designers recognize and discuss ethical problems in mobile sensing, what sorts of moral agency engineers recognize (e.g. designer agency, user agency, system agency) or confuse, what ethical issues designers are aware of or discovering, and how designers address these issues through design. It can also reveal how laboratory processes and structures can affect ethical perceptions and decisions.

I will also conduct interviews and focus groups with mobile sensing users and clients. Interviewing users and clients after they have participated in a CENS mobile sensing campaign can allow me to uncover ethical concerns not discussed in the design space. This interaction with users will allow me to contrast user perceptions of ethical challenges against designer perceptions.

Because of my closeness to my ethnographic setting and subjects, my work will follow the tradition of “collaborative ethnography” influenced by critical and feminist approaches to anthropological fieldwork (Lassiter, 2005). Collaborative ethnography, writes Lassiter, is:

…an approach to ethnography that deliberately and explicitly emphasizes collaboration at every point in the ethnographic process, without veiling it—from project conceptualization, to fieldwork, and, especially, through the writing process (2005, p. 16).
Two influential members of my research population sit on my dissertation committee, have played a pivotal role in the conceptualization of this research, and will regularly review my progress and writing. I will also share segments of my questions and findings with CENS lab members as they are willing and interested. Their opinions, feedback and input, whether offered during interviews, over dinner, or through formal critique of my writing, will be an important part of this research.

I have spent a year in the research setting at the date that my proposal was written, and over the course of my dissertation project, plan to spend an additional year and a half. I will actively record field notes in meetings for at least one full year during my stay. This research timeline fits the academic cycle at CENS. Students arrive in September and work on discrete projects through the following August. Sensing campaigns are not strictly tied to the academic schedule, but the academic year certainly affects the pacing and life of the lab.

I will begin with a semi-structured interview with each consenting member of the CENS mobile sensing team. I estimate that I will interview approximately 20-30 undergraduates, graduate students, full-time staff, and faculty. I will therefore take into account time already spent in the lab (measured in number of school years) and amount of participation (in testing, lab meetings, etc) when analyzing the data from these interviews. Because “ethical issues” may seem like a daunting subject for designers focused on their own projects and concerns, all interviews will start by asking the informant to describe the projects in which they are involved. Talking about projects will ground our discussion, engage the informant, and present openings to talk about ethical decisions they have faced or made within their work (Fisher, 2007).

Over the year following initial interviews, I will participate, observe and take field notes during both full group and small group design meetings (approximately two meetings per week). I may also take photographs of design meetings when visual aids might capture diagrams, inscriptions,
or group interactions. I will analyze presentations and papers produced by the design team for attention to ethical issues and rationalization of design decisions that affect privacy, consent, equity, limited data retention, or data minimization.

In addition to interviews, observations, and analysis of papers and presentations produced by lab members within the project timeline, I will undertake an analysis of the ethical consequences of systems produced during the course of the year. I will examine how the technologies produced by the design team grapple with or ignore ethical problems, and analyze what solutions lab members have employed for problems such as privacy, consent, equity, limited data retention, and data minimization. Comparing designers’ statements in interviews and meetings with the products of their design work will allow for analysis of the ways both professed and silent values materialize in technology.

To evaluate what laboratory processes successfully foreground ethical questions, I will perform an evaluation-oriented analysis of my interview data, observation field notes, and lab presentations, publications, and technologies. Focusing the coding and analysis of this body of data on instances of, and motivations behind, ethical learning will allow me to compare the effectiveness of concrete lab practices on values in design. How do lab members respond to the ethics advocate? What do they indicate they have learned from their mentors? What did they learn from testing systems on themselves? How did they react to feedback from clients and users? And how did they react to institutional ethical mandates handed down by the IRB? Which of these processes (if any) do they credit with new respect for ethical problems? Which of these processes (if any) encouraged them to make design changes?

I will also observe the everyday work of design to supplement my interview data. My observation of design meetings and workshops will focus on ethical debates and decision-making
during the design process. Coding field notes to foreground conflicts over ethical questions and the reasoning behind design decisions can help me better understand the intersection of ethics and design. What ethical issues arise for designers, and how do they address those issues through design? What issues do they avoid, dismiss, or reframe? What are their stated justifications for the decisions they make? How do they weigh ethical design against other interests, such as completing a project quickly, elegantly, or efficiently? How do they articulate different kinds of data, and different ethical requirements that may result?

Though my initial data gathering and analysis will focus on the issues I have outlined above, an important goal of this work is to open up new questions that I have not discovered or addressed in this proposal. Ethnography, write Franklin and Roberts (2006):

…relies on the assumption that we may not know what the important questions are, or why, or how to ask them. Good ethnographic investigation thus often produces its most valuable findings as questions rather than answers (Franklin & Roberts, 2006, p. 82).

New questions about the ethics of mobile sensing will be a final product of this dissertation research.

*Data analysis*

At the end of each interview or day of observation, I will transcribe field notes and memos. Longer interviews will be professionally transcribed. I will organize my transcripts and code them using the Atlas.TI software package. Coding interview data and ethnographic field notes will create a typology of design processes that enable or impede ethical decision-making in the design setting. Though codes will initially reflect my variables of interest, I will also allow codes to emerge as I see new themes materialize in my observations and interviews. Axial coding will enable description and
discovery beyond what I have envisioned in my existing theoretical structure, allowing new theory to emerge from the evidence (J. Lofland, Snow, Anderson, & L. H. Lofland, 2006).

Because I am the sole researcher on this project, I must be careful to avoid coding bias. I will solicit graduate student colleagues to review my coding schema alongside samples of the content I have coded. I will ask them to discuss any discrepancies or differences of opinion in coding to highlight any bias my coding might have produced, and refine my coding schema according to their suggestions.

Application and refinement of the coding schema will be a tool for pattern discovery in both the observation and interview data. I will analyze the coded field notes for qualitative evidence of relationships between particular design processes and changes in thinking about the ethical issues in mobile sensing. In addition, the coded interview data should allow for deeper, ideographic understanding through case-oriented analysis. Each interview will serve as a case, where a complex matrix of personal factors, intervention exposure and reactions, and design experience affect a subject’s reaction to ethical problems in design. Cases can be compared against each other to look for overlap or deviation among variables that seem important in ethical decision-making.

Expected Findings

My dissertation will yield at least three types of findings. The first set of findings will be theoretical understandings of what empowering mobile sensing that avoids surveillance might entail, and the conditions under which such a vision can thrive. The second set of findings will be design recommendations to enable an empowering vision of mobile sensing. The third set of findings will be policy recommendations to encourage technological innovation which emphasizes privacy and anti-surveillance values. Together, the findings of this dissertation will enable advances in ubiquitous computing while protecting democratic, anti-authoritarian social values.
Schedule of Completion

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<td>Proposal Presentation</td>
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<td>Participation, observation of meetings</td>
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<td>Analysis of interview data, observation data, publications</td>
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<td>Finalize thesis, author papers</td>
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Budget and Justification

Because my field site is in the city where I live, costs are fortunately few. The largest cost is interview transcription, which is a time-consuming and expensive process. Estimated costs are:

*Interview transcription:* 30 hours @ $150/hour = $4500

Transcription facilitates data coding and the ability to draw conclusions from free-text data.

*Conference travel:* Airfare and lodging for 2 conferences = $1800

Conference travel will allow me to compare work with, and learn from, other researchers working in values in design, ethics in engineering, and information privacy.

Other Support

This work is supported under National Science Foundation grant number 0832873. The grant pays my wage as a graduate student researcher at 50% time through spring of 2011. It also contributes some funds towards transcription and conference travel.

Dissertation Adviser

Dr. Christine Borgman, Department of Information Studies, University of California Los Angeles.

(Her letter of reference is included in the supplemental materials).
References


**EDUCATION**

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<th>University of California Los Angeles</th>
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<td>MLIS 2007</td>
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<td>Specialization in Archival Studies</td>
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**PhD expected 2011**

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<th>Specialization in Information Policy</th>
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**Oberlin College**

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<th>B.A. 2003</th>
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<td>Majors in History and German Studies</td>
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**FUNDING, AWARDS & HONORS**

**Funding**

Funding

NSF Award IIS-0832873: “Ethics Education for Participatory Urban Sensing”

September 2008 – August 2011, $300,000

**Awards**

Awards

Information Studies Dissertation Proposal Award, 2009

Best paper, 4th International Symposium on Location and Context Awareness

UCLA Collegium of University Teaching Fellows fellow, 2009-2010

Finalist, CNI's Paul Evan Peters Fellowship, 2008

Recipient of GSE&IS Faculty Fellowship, 2007

Recipient of UCLA’s Andrew Horn Award, 2007

Recipient of UCLA’s Andrew Horn Award, 2006

Recipient of California Special Library Association’s Sternheim Award, 2006

1st Runner-Up, LACASIS McKinley Student Scholarship Competition, 2006

Recipient of UCLA’s Mardellis Fellowship, 2005

Phi Beta Kappa Honor Society Member

National Merit Scholar

**PUBLICATIONS**

**Refereed Journal Articles**


**Magazine Articles**


**Conference Proceedings**


Shilton, Katie, Ramanathan, N., Reddy, S., Samanta, V., Burke, J., Estrin, D.,


**Workshop Papers**


**Technical Reports**


**Book Reviews**


**Theses**


**RESEARCH EXPERIENCE**

Research Assistant, “Privacy and Participation in Urban Sensing” Center for Embedded Networked Sensing, October 2007 - Present

Leading research, policy development, and system design to incorporate privacy and encourage participatory design of ubiquitous sensing technologies.
| Research Assistant, “Tools for Humanists”  |
| Created an evaluation strategy for digital humanities resources and co-authored two white papers on digital humanities tools as a piece of U.S. cyberinfrastructure. |

| Research Assistant, “Ecologies of Attention and Forgetting”  |
| UCLA Department of Information Studies, 2006-2007 |
| Information seeking, research, grant writing, and event management relating to surveillance, technological capture, and the social benefits of forgetting. |

| Research Assistant, “Nonprofit Information Specialists Study”  |
| Coordination of a project exploring possibilities for a service to meet information needs of the California nonprofit sector. Conducted literature reviews, coordinated a team of nonprofit information experts, and suggested, modeled, and evaluated potential information services. |

| Research Assistant, “The South Asian Net”  |
| UCLA Department of Information Studies, Fall 2005 – Spring 2006 |
| Assisted in the conceptualization of a digital repository for narratives of the South Asian diaspora in Los Angeles. |

| INVITED PRESENTATIONS & WORKSHOPS  |

| Invited Participant, Privacy Law Scholars Conference, George Washington University. June 2010 |


| “Context Awareness and Privacy in Urban Sensing.” Talk given at the CENS |


“Because the Stakes are Higher: Ethics in Participatory Urban Sensing.” Presentation given for the UCLA CENS Seminar Series. Los Angeles, CA, January 11, 2008.

Featured speaker, UCLA GSE&IS Dean’s Scholars Dinner, 2007. Los Angeles, CA


“Exploring Privacy and Participation in Digital Archives.” Presentation given for the UCLA Department of Information Studies Round Table for the Open World Program. Los Angeles, CA, September 2007.


“‘This Scholarly but Colored Alumna’: Anna Julia Cooper’s Troubled Relationship with Oberlin College.” Paper given at the Great Lakes College Association Black Studies Conference, Oberlin, OH, 2003.

ACADEMIC SERVICE

Book Review Editor, Interactions: UCLA Journal of Education and Information Studies, Fall 2009 – present


Planning committee member, “Ethical Guidance for Research and Application of Pervasive and Autonomous Information Technology (PAIT).” Workshop organized by Indiana University, Spring 2010.


Reviewer for the 2009 iConference: iSociety: Research, Education, Engagement
Reviewer for the 2008 Participatory Design Conference
Reviewer for the 2008 i:Conference: iFutures: Systems, Selves, Society

Chair, “Participation and Privacy Reading Group.” Center for Embedded Networked Sensing, October – December 2007.


Student representative to the GSE&IS faculty search committee, Fall 2006

Member of the Student Advisory Board, InterActions: UCLA Journal of Education & Information Studies, 2006 – ongoing

Reviewer for InterActions: UCLA Journal of Education & Information Studies, 2006-ongoing

<table>
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<th>TEACHING EXPERIENCE</th>
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| **Instructor, IS 98T: Mobile Technologies: Participation and Surveillance**  
*UCLA Department of Information Studies, Spring 2010*  
Selected for a competitive UCLA-wide program to organize and teach a course on the social impact of pervasive mobile technologies. |

| Guest Instructor, IS 200: Information in Society  
*UCLA Department of Information Studies, Fall 2009*  
Lead a discussion on privacy, surveillance and information policy for library science and information professionals. |

| Guest Instructor, IST 618: Survey of Telecommunications and Information Policy  
*Syracuse University School of Information, Fall 2009*  
Lead a lecture and discussion on participatory approaches to privacy management. |

| Guest Instructor, FILM TV 298A: Engaged Media Production  
*UCLA Department of Film & Television, Spring 2009*  
Lead a class on the ethical concerns raised by mobile and participatory media. |

| Guest Instructor, CS199r: Privacy and Technology  
*Harvard University, Spring 2009*  
Lead a class session on what it means to foster participation in technical systems, especially in respect to privacy decision-making. |

| Guest Instructor, LIBR 561: Information Policy  
*University of British Columbia School of Library, Archival & Information Studies, Fall 2008*  
Lead a class session on new ethical issues raised by digital archives and digital capture technologies. |

| Guest Instructor, IS 438A: Archival Appraisal  
*UCLA Department of Information Studies, Spring 2008*  
Lead week on alternate frameworks for appraisal, including participatory models, and models challenged by ethics of privacy. |

| Guest Instructor, CS 219: Special Topics in Computer Science  
*UCLA Department of Computer Science, Spring 2008*  
Introduced the class to ethical topics, including problems of privacy and participation, in embedded networked sensing. |
Reader, IS 270: Introduction to Information Technology  
*UCLA Department of Information Studies, Winter 2008*  
Held office hours, assisted students to understand course material and shape course assignments, and graded coursework for this core course for the Master’s of Library and Information Studies degree.

Instructor, Building Skills for Community Archives  
*Southern California Library for Social Studies and Research, March 2008*  
Designed and lead a workshop on basic skills for participatory processing of community archives.

Instructor, Intensive Technology Workshop  
*UCLA Department of Information Studies, Summer 2006 and 2007*  
Designed and taught a workshop on the bibliographic software utility Refworks; taught workshops on network architecture and imaging software.

Instructor, RefWorks Workshop  
*UCLA Department of Information Studies, Fall 2006*  
Continued instruction in RefWorks bibliographic software to interested students, faculty and staff in the Information Studies program.

**CURRICULUM DEVELOPMENT**

Instructor, IS 98T: Mobile Technologies: Participation and Surveillance  
*UCLA Department of Information Studies, Spring 2010*  
Developed an undergraduate seminar curriculum focused on the social impact of pervasive mobile technologies.

Curriculum Intern, Preservation Management Workshop  
*Cornell University Libraries, Summer 2006*  
Authored a 1-hour and 3-hour continuing education curriculum on preserving electronic institutional records aimed at librarians, archivists, and museum professionals.

Curriculum Developer, IS 289: Digital Preservation Course  
*UCLA Department of Information Studies, Summer 2006*  
Assisted Dr. Jean-François Blanchette in the design of topics, readings, lectures, and an evaluation mechanism for a new course offering in digital preservation.

**PROFESSIONAL EXPERIENCE**

Archivist Intern  
*The Wende Museum, Culver City, CA, 2006*  
Processed archival documents and museum artifacts dating from Cold War-era East Germany.

Multimedia & Information Technology Assistant  
*UCLA Multimedia & Information Technology Lab, 2005 – 2007*  
Assisted students and faculty in use of networked information resources, print materials, and multimedia resources. Participated in the development and implementation of instructional components to support the MLIS curricula.

Information Systems Consultant  
*Center for Women and Enterprise, Boston, MA, Ongoing*  
Ongoing database management work. Organized a management system for shared electronic documents. Created a manual and a staff training presentation to aid in the system’s use. Wrote a grant that secured over $300,000 in federal and state government grants for small business development in Massachusetts.

Information Systems Consultant  
*Dr. Sidney Brown, Forensic Psychologist, Los Angeles, CA, 2005 – 2006*
Populated and taught use of a searchable Endnote database of psychology journal articles for forensic research.

**Legislative Liaison and Executive Assistant**  
*Center for Women & Enterprise, Boston, MA, 2003 – 2005*  
Secured two $250,000 state earmarks and over $300,000 in federal and local government grant funding. Responsible for tracking relevant legislative issues and funding sources, as well as using stakeholder and client base to influence government support. Responsible for extensive database work, web and e-newsletter publishing, communication with stakeholders and Board of Directors, event planning, and managing the executive office.

**Associate Archivist**  
*Oberlin College Archives, Oberlin, OH, 2003*  
Arranged and described the papers of Congressman Donald Pease. Assisted in the editing of the published finding guide.

**Associate Archivist**  
*Circle Pines Center Cooperative Delton, MI, 2001*  
Created an archival repository for a 60-year-old cooperative enterprise. Appraised existing files, and arranged, described, and preserved thousands of organizational and personal records.

**PROFESSIONAL ACTIVITIES**  
Vice President of the UCLA Student Chapter of the Society of American Archivists, 2005 – 2006

Vice President of the UCLA Student Chapter of the Special Libraries Association, 2006 – 2007

**OTHER SKILLS**  
Trained and experienced in ethnographic data collection and analysis.

Skilled in MS Office Suite; Endnote and RefWorks bibliographic software; Macromedia Dreamweaver web publishing software; MapInfo GIS software; databases including Access, ACT and Raiser’s Edge.

Proficiency in both written and spoken German.

UCLA “Protecting Human Research Subjects” Certification

**REFERENCES**  
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