1. PROJECT TITLE
Life-Logging with SenseCam and Activity Trails

2. PRINCIPAL INVESTIGATOR
James D. Hollan, Professor, Department of Cognitive Science

3. FACILITIES
Research will be conducted in the Human Computer Interaction and Distributed Cognition Laboratory on campus.

4. ESTIMATED DURATION OF THE STUDY
January 2010 through June 2010

5. SPECIFIC AIMS (2 paragraphs maximum)
The purpose of this research is to characterize the rich description of recalled events that life-logging technologies are helpful for, for individuals with no memory impairments. This research will make use of two life-logging technologies: 1. SenseCam, a small wearable low-resolution digital camera that can passively take pictures throughout the day at fixed intervals, or in response to changes in light levels (i.e. when the wearer moves from indoors to outdoors, the change in light levels will be detected, triggering SenseCam to take a photo), or when manually triggered by the individual wearing the SenseCam. 2. ActivityTrails, a software that records onscreen user activity during instances calculated by an algorithm that denotes changes in the number of keystrokes made, number of applications open or closed, and the number of windows open or closed. Furthermore, this study will also identify if there are consistencies or significant differences in the kinds of details recalled from reviewing recorded events captured by SenseCam and ActivityTrails.

6. BACKGROUND AND SIGNIFICANCE (2-3 paragraphs maximum)
Life-logging is the act of recording different aspects of our daily life in digital form. The idea of a life-log is a concept that can be traced back 60 years ago—the vision was that technology would allow us to capture everything that has ever happened to us and archive everything we have ever experienced digitally. In the recent years, this vision matured with the development of novel technologies and affordable storage for life-long data, supporting the capture of data from everyday life and storage of large amounts of personal data. As a result of improving technology, life-logging technologies, like SenseCam, developed by Microsoft Research Cambridge, and ActivityTrails software, developed by UCSD graduate student, Gaston Cangiano allow us to capture and store our everyday activities, bringing us the opportunity to review and reflect on our past.

The field of life-logging is relatively new, but, is an expanding area of research. Past research reveals, there is evidence to support that SenseCam can help those with neurodegenerative conditions recall events from memory. Though life-logging technologies, like SenseCam have medical applications that support the memory of those with memory impairments, in my research, my motivation for investigating both life-logging technologies is to identify the types of details (i.e. people, object, place, action, etc.) that are recalled from past events when reviewing SenseCam and ActivityTrails images. Reviewing SenseCam and ActivityTrails images may provide a rich recollection of detail of past events, in comparison to the recollection of the same past events without such aids. To our knowledge, no research has been conducted on characterizing the rich recollection of past events with the aid of both SenseCam and ActivityTrails data.

7. PROGRESS REPORT/PRELIMINARY STUDIES
This is a new application—there are no preliminary results to report.

8. RESEARCH DESIGN AND METHODS (1 page maximum)
Experimental research will involve participants recording with two life-logging technologies, SenseCam and ActivityTrails. The experiment will involve 15-20 participants. Before participants are asked to record, they will be
asked a series of questions from a survey (see attached) about their activities during a typical weekday, including their extracurricular activities, jobs, classes, hobbies, and computer activities. This survey will help the experimenter identify an activity that participants can record using SenseCam and ActivityTrails. After an activity is identified, the participant will be instructed to record with SenseCam and ActivityTrails when they are participating or engaging in the identified activity. This will give participants full control of what they will be recording. Recording with both devices should not exceed longer than one day.

Participants will be asked to return to the laboratory the day after they have recorded with SenseCam and ActivityTrails so data can be downloaded onto one designated computer in our laboratory. Participants will be scheduled to return to the lab after one week of their recorded day to review their recorded data with the experimenter. Participants will be video recorded in our UCSD laboratory when they review their data. When reviewing their images, participants will be asked to narrate the details they remember from the images. Because it is not possible to understand all that happens when participants are narrating details they remember in real-time, reviewing video recordings of participants will allow the researcher to review word-for-word what was articulated by the participant that reveal subtle insights about how life-logging technologies aid in the recollection of details of past events. Capturing and reviewing activity through video recordings is fundamental to the success of this project. At any point and for any reason the subject may ask to have the video recording turned off and/or erased, and at which point we will cease video recording and take adequate steps to remove their data from the camera.

All recorded data of participants and recorded video will only be accessible by the experimenter and by request of the participant who was recorded. A username and password will be required to access the designated computer with the stored data.

9. HUMAN SUBJECTS (2 paragraphs maximum)
Over the course of this research project we anticipate that 15 to 20 subjects will participate. Subjects will be male and female (recruited in equal percentages) and from a variety of ethnic and academic backgrounds. Because participants will be recruited on campus and recruited within the investigator’s social network group, all subjects will be age 18 or older. Because research focuses on populations that have no memory impairments, study participants recruited will have healthy memory and no cognitive impairments.

10. RECRUITMENT
Participants will be recruited by word-of-mouth within the investigator’s social network group on campus. Participants will be recruited in this manner because reliable participants are vital to this study. Friends or colleagues that are asked to participate in the study are more likely to consider the safe handling of the SenseCam device and have more motivation for participating in a comprehensive study using both SenseCam and ActivityTrails, in comparison to randomly selected participants recruited by flyers. To avoid participants from feeling obligated to participate in this study or continue to participate, investigator will try to select individuals who may not be subject to feeling this type of pressure (i.e. individuals who are not in a position where the investigator can influence their future as a employee, student, etc.) Since recruitment will take place on campus, participants will be age 18 or older.

During recruitment, participants will be told that the research project is investigating memory and the details of their recollection of events from their everyday lives. In addition, participants will be informed that if they choose to participate, they will wear a small digital camera for a selected activity for less than a day that will occasionally take low-resolution photographs of the visual scene in front of them, and/or also activate a desktop recording software on their personal computer that will take screenshots of their onscreen activity based on an algorithm. They will so also be told that their memory for the recorded events will be tested at a later time interval. Recruitment will be ongoing, and a participant may withdraw from the study at anytime.

11. COMPENSATION FOR PARTICIPATION
No form of monetary compensation will be provided for subjects involved in all phases of research. All participants
will be strictly participating on a voluntary basis.

12. INFORMED CONSENT
The researcher will first explain the study to each participant. At this time the participant will be provided with a written consent form and given sufficient time to review the consent form and sign if they choose to participate. A copy of the Written Consent Form is attached.

13. ALTERNATIVES TO PARTICIPATION
The alternative to participation is not to participate.

14. POTENTIAL RISKS
There are no anticipated physical risks, beyond those encountered in daily life, associated with participating in this study. However, participants may potentially feel uncomfortable as a result of wearing SenseCam or recording with ActivityTrails in a situation where it could take a picture they would prefer not seen by the experimenters. However, prior to recording, the participant selected an activity with the researcher they are comfortable recording. In addition, the experimental procedure allows the participant to deactivate the recording device at anytime and also ask the experimenter to delete any pictures and any desktop screenshots without viewing them at the participants’ requests, which minimizes this risk.

15. RISK MANAGEMENT
Several aspects of the procedure are designed to safeguard the rights and privacy of participants. The SenseCam is equipped with two methods by which participants will be able to deactivate it anytime, should they prefer to avoid the possibility of images being captured in any places, times, or situations.

First, the SenseCam has an ON/OFF button for complete deactivation (off) or reactivation (on). Second, the SenseCam has a “DO NOT DISTURB” button in which the camera will remain on, but have absolutely no images captured. The SenseCam will remain deactivated for 7 minutes, and will alert participants with a beep 15 seconds before it reactivates. Participants may press the “DO NO DISTURB” button again to reset the device into this mode to last for another 7 minutes. They may reactivate the SenseCam from this mode at any time by pressing the manual shutter button.

ActivityTrails software is also equipped with the option to deactivate recording at anytime, should participants prefer to avoid their desktop activity from being recorded. First, to deactivate ActivityTrails from recording, participant must go to the task bar located on their desktop and click on the green ActivityTrails icon. Once clicked, participants can select the option “Deactivate Activity Trails” to temporarily stop recording. The ActivityTrails software will be still on at this time, though absolutely no screenshots will be captured. Second, participants can quit out of ActivityTrails by selecting the “quit” option in the task bar.

Ensuring confidentiality and privacy of data involving all participants is a central concern. Participants will only be instructed to record when participating or engaging in the selected activity they are comfortable recording. However, should participants want any images or screenshots captured during a certain time period to be deleted without being seen by anyone (i.e. during a time when they would have preferred for the SenseCam and/or ActivityTrails to be deactivated but forgot to deactivate it), they can note the time period so the researcher can delete all images from that period. Participants may also ask researcher to destroy field notes or all or part of video recordings involving any private information should it be necessary.

In the event that any of the non-deleted images should contain information concerning any illegal activity, we would adhere to section 4.05 of the 2002 APA Ethical Principles of Psychologists and Code of Conduct, which states: “(b) Psychologists disclose confidential information without the consent of the individual only as mandated by law, or where permitted by law for a valid purpose such as to… (3) protect the client/patient, psychologist, or others from harm.”
16. POTENTIAL BENEFITS
The benefits for participants are minimal. They will have the experience of seeing parts of their everyday lives a second time, and may gain insight into their memory for everyday events. (This is an experience that previous participants in students in the UK have found enjoyable).

17. RISK/BENEFIT ASSESSMENT
Given that there are no anticipated physical risks beyond those encountered in daily life, and that the risk of unwanted pictures and screenshots seen by the experimenter is accounted for in the experimental procedure, we feel that the benefits outweigh the risk.

18. QUALIFICATIONS, TRAINING, CULTURAL LITERACY AND ROLES OF THE PI AND RESEARCH TEAM
The PI, Jim Hollan, will oversee all aspects of research on this project. This proposal is the Honors Thesis topic of undergraduate student, Nastasha Tan, who will perform all of the data collection and analysis. However, graduate students within the Human-Computer Interaction and Distributed Cognition Laboratory may assist with data collection and analysis. Prior to the start of this project, Nastasha has reviewed existing literature on SenseCam, Activity Trails, and other life-logging devices to understand the challenges of conducting research using such new technologies. Nastasha also has experience recording her own daily activities with the SenseCam device and recording with ActivityTrails software. In addition, Nastasha has also had experience analyzing ActivityTrails data using video recording as a past research assistant for graduate student, Gaston Cangiano.

In addition to project advisor, Professor Jim Hollan, the project committee includes UCSD graduate students, Gaston Cangiano, Adam Fouse, and Dr. Nadir Weibel.

19. FUNDING FOR THIS PROJECT
There is no funding support for this project. However, tools (i.e. SenseCam device and ActivityTrails software) essential for this project will be provided by the Human-Computer Interaction and Distributed Cognition Laboratory.

20. CONFLICT OF INTEREST
There are no known conflicts of interest.

21. BIBLIOGRAPHY (1 page maximum)