Match outing outcomes for students, staff, and the community include:

- **Activities** may range from assistance with device assessment and repair, to help clients with devices in need of repair/troubleshooting will work together with Gadre Garage student staff and volunteers to perform the necessary device assessment and maintenance activities. Depending upon the situation, activities may range from guidance on how to make your computer/device run faster to actual repair and replacement of components.

Desired outcomes for students, staff, and the community include:

1. Hands on experiences for UI students, not only in terms of performing repairs, but also in process documentation and fostering sustainable behavior on a larger scale through the iFixit Technical Writing Project; marketing and business operations; lessons in industrial design for repair and recyclability; and in environmental education and communication.
2. Increased awareness of electronics laws and recycling options.
3. Increased awareness of sustainability issues surrounding electronic products throughout their lifecycles.
4. Decreased misconceptions regarding the disposability of devices and prohibitive complexity of electronics repair and maintenance.

Project Team: William Bullock, Art+Design; Jon Gant & Martin Wolske, GSLIS

Provide a brief background of the project, goals, and desired outcome.

Electronic waste, or e-waste, is a growing national and global problem. According to the US Environmental Protection Agency ([http://www.epa.gov/osw/nonhaz/municipal/pubs/2012_msw_fs.pdf](http://www.epa.gov/osw/nonhaz/municipal/pubs/2012_msw_fs.pdf)), only 29.2% of electronics were recycled in the US in 2012. While the proportion of electronics recycled nationally has increased in recent years, due largely to landfill bans and related legislation in various states, it’s also true that our consumption of electronic devices is increasing over time. For example, PC World reported that 1 billion smartphones were shipped worldwide in 2013—enough for roughly 1 in every 7 humans on the planet ([http://www.pcworld.com/article/2091940/global-smartphone-shipments-topped-1-billion-in-2013.html](http://www.pcworld.com/article/2091940/global-smartphone-shipments-topped-1-billion-in-2013.html)). That’s a staggering statistic for only one category among many electronic devices which saturate our lives. Beyond items like your phone or laptop, electronic components appear in a multitude of everyday items not typically considered “electronics,” from coffeemakers to greeting cards that play music. The manufacture and transport of electronics require great investments of natural and human resources in a variety of ways, and include economic, social, and environmental impacts throughout their product lifecycles. Meanwhile, society continues to foster the perception of electronics as items meant to be replaced frequently as newer models are released, or to be considered completely disposable (in the case of products like electronic greeting cards). The belief of many consumers that electronics are too complex or expensive for a layperson to repair often contributes to the short lifespan of electronics in practice, causing people to replace mildly damaged equipment rather than investing resources in maintenance. The United Nations University ([http://unu.edu/news/news/step-launches-interactive-world-e-waste-map-2.html#info](http://unu.edu/news/news/step-launches-interactive-world-e-waste-map-2.html#info)) has estimated that an average of 7 kg of used electrical and electronic products are produced per person per year globally, and that by 2017 this collective annual volume of e-waste will increase by a weight equal to 11 Great Pyramids of Giza. Our “throw-away society” may become our most monumental mistake.

To address these collective societal challenges and foster sustainable behavior and extension of useful product life within our campus community, we propose to launch a center, using seed funding from SSC, where UI students and staff will bring their personal electronic devices for assistance with assessment and repair. We call this center the Illini Gadget Garage (hereafter referred to as “Gadget Garage” or “Garage”). Using the same “collaborative repair” model employed at the campus bike shop and MakerSpace Urbana ([http://makerspaceurbana.org/projects/computer-help-desk/](http://makerspaceurbana.org/projects/computer-help-desk/)), clients with devices in need of repair/troubleshooting will work together with Gadget Garage student staff and volunteers to perform the necessary device assessment and maintenance activities. Depending upon the situation, activities may range from guidance on how to make your computer/device run faster to actual repair and replacement of components.

**Matching funds & in-kind contributions:** In-kind contribution of tools from iFixit, valued at $2110, contingent upon receipt of seed funds from SSC. $10,000 in matching funds from ISTC, contingent upon receipt of seed funding from SSC (from sources including the SEI Various Donors Fund, Sustainable electronics-related teaching activities, and other funds related to waste reduction education). Matching funds in the range of $2500-$4999 from HOBI International Inc., also contingent upon receipt of seed funds from SSC.

**Project Lead:** Joy Scrogum

**Project Team:** William Bullock, Art+Design; Jon Gant & Martin Wolske, GSLIS

**SSC Step 2 proposal**

**Illini Gadget Garage: Education through Electronic Product Life Extension**

**Requested from SSC:** $95,000

**Provide a brief background of the project, goals, and desired outcome.**

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To address these collective societal challenges and foster sustainable behavior and extension of useful product life within our campus community, we propose to launch a center, using seed funding from SSC, where UI students and staff will bring their personal electronic devices for assistance with assessment and repair. We call this center the Illini Gadget Garage (hereafter referred to as “Gadget Garage” or “Garage”). Using the same “collaborative repair” model employed at the campus bike shop and MakerSpace Urbana ([http://makerspaceurbana.org/projects/computer-help-desk/](http://makerspaceurbana.org/projects/computer-help-desk/)), clients with devices in need of repair/troubleshooting will work together with Gadget Garage student staff and volunteers to perform the necessary device assessment and maintenance activities. Depending upon the situation, activities may range from guidance on how to make your computer/device run faster to actual repair and replacement of components.

**Desired outcomes for students, staff, and the community include:**

1. Hands on experiences for UI students, not only in terms of performing repairs, but also in process documentation and fostering sustainable behavior on a larger scale through the iFixit Technical Writing Project; marketing and business operations; lessons in industrial design for repair and recyclability; and in environmental education and communication.
2. Increased awareness of electronics laws and recycling options.
3. Increased awareness of sustainability issues surrounding electronic products throughout their lifecycles.
4. Decreased misconceptions regarding the disposability of devices and prohibitive complexity of electronics repair and maintenance.
5. Contribution to the overall efforts to make ours a more sustainable campus with a reduced carbon footprint.

This collaborative project will involve team members from ISTC, the School of Art and Design, and the Graduate School of Library and Information Science (GSLIS). ISTC will bring together various stakeholders from UI staff, faculty, and student organizations, as well as relevant businesses and community groups via ISTC’s Sustainable Electronics Initiative (SEI) campus consortium (http://www.sustainelectronics.illinois.edu/services/campusconsortium.cfm). This consortium, through regular meetings hosted by ISTC, will provide input and feedback on project progress and development in an advisory capacity. The campus consortium includes faculty, staff, and students from a variety of disciplines brought together by a common interest in education, operations and research related to sustainable electronics, and will provide insights into relevant courses, programs, and student organizations that may benefit from involvement in the Gadget Garage and collaborations associated with it. Interested members of the SSC are encouraged to become involved in the campus consortium and participate in discussions related to the Gadget Garage. ISTC will coordinate operational details such as obtaining a space for the Garage, tools and necessary materials; coordination of project team members; and providing progress reports to SSC. ISTC will seek in-kind contributions and matching funding from relevant corporate sponsors (drawing from relationships forged through SEI’s past educational projects) and private donors (via the UI Foundation SEI Various Donors Fund), as well coordinating applications for other campus and external funding opportunities (e.g. the Graduate College’s Focal Point program, Office of Public Engagement Grants, etc.). ISTC will primarily serve to facilitate and coordinate efforts among stakeholders to bring the Illini Gadget Garage to fruition, and assist with making it a self-sustaining campus operation. The School of Art and Design will be involved through a class taught by Professor William Bullock, described in greater detail below. GSLIS will perform a community needs assessment, and will lead the development of a long-term, stakeholder informed strategy for the operation of the Gadget Garage (also described in greater detail below) beyond its initial seed-funded year.

The Garage will begin operation in fall 2015, in conjunction with a special topics course taught by William Bullock. Note that the operations and service model of the Garage will be adjusted and developed over time based on work by the GSLIS team, but the following represents the initial approach. Because we are seeking seed funding from the SSC to launch this center, during its first year of operations, UIUC students will be able to use the tools and guidance available at the Gadget Garage for free (with a student ID). Staff members will also be able to use the tools and guidance available at the Gadget Garage in exchange for an annual membership fee. Fees will be applied toward the operations of the Gadget Garage, and become part of plans to make it self-sufficient after its inaugural year. Donations will also be accepted from anyone who wishes to help support the continued operation of the repair center. If parts or components need to be purchased to complete the repair of a device, that will be the responsibility of the device owner; Gadget Garage staff/volunteers will assist in identification of needed parts and sources, guiding clients to local electronics repair businesses and retailers wherever possible, and encouraging reuse of parts as appropriate.

If a device cannot be repaired using the tools and knowledge provided by the Gadget Garage, clients will be referred to relevant local repair shops and services. If a device cannot be repaired, Gadget Garage clients will be provided with information on local responsible recycling options, along with information on current IL state electronics legislation (e.g. the landfill ban and covered electronic devices). Clients will also be provided with information on take back and donation programs for unwanted devices, in order to raise awareness of such programs, assist the campus community, and keep electronics in use for as long as possible. The project leader, who serves as coordinator for ISTC’s Sustainable Electronics Initiative, will provide expertise and guidance for these types of activities.

It should be noted that under IL state law, collectors, recyclers, and refurbishers of electronic devices are required to register with the IL EPA and pay an annual registration fee (http://www.epa.illinois.gov/topics/waste-management/electronics-recycling/collectors-recyclers-refurbishers/index). Project leader Joy Scrogum has communicated with Dave Walters and Michelle Bentley of IL EPA and confirmed that the Illini Gadget Garage will not need to register with the state in this way, as the primary goals of this center are repair and education (this was in question at the time of submission of the Step 1 application for this project).
Special topics course
The Gadget Garage will provide unique experiential learning opportunities for UI students and staff who use the tools and workspace for collaborative repair of devices. In conjunction with the Gadget Garage, William Bullock, professor and chair of the Industrial Design Department within the UIUC School of Art and Design, will also teach an interdisciplinary special topics course during the fall 2015 semester. Students in this course will learn about the environmental and social impacts of electronic devices throughout their product lifecycles, and examine the role that design decisions play in making electronic devices difficult to repair or maintain. Students in this course will also participate in collaborative repair with student and staff clients that bring in their devices to the Garage, and wherever possible, write repair guides for these devices as part of the iFixit Technical Writing program (http://edu.ifixit.com/). This program was previously used as an activity in a course taught during the spring 2014 semester by project leader Joy Scrogum; thus UIUC is already a University partner of iFixit. In this program, students create step-by-step guides for repair or replacement of batteries or other components for products (not restricted to electronics) with photos, to be published and shared on the iFixit website. Thus anyone who visits the iFixit site is empowered to maintain and extend the useful life of products for which UIUC students prepare guides. Note that students participating in the technical writing program may also choose to prepare guides for their personal devices, or for devices leant to them by iFixit (for return to iFixit at the end of the course).

As is typical of such interdisciplinary courses taught by Professor Bullock as part of his Product Innovation and Research Lab (PIRL) efforts, business and marketing aspects of products will also be considered. Students participating in this special topics course will prepare a suggested marketing/business plan for the Gadget Garage. Their plan will be taken into consideration with findings of GSLIS project team members, and input from members of the UIUC Sustainable Electronics Campus Consortium, to inform continued development of the Gadget Garage in spring 2016. It will also be considered in preparation of recommendations for the future of the Garage at the end of the project period.

Beyond the completion of the special topics course, the project team will work with other interested students and faculty via the UIUC Sustainable Electronics Campus Consortium to continue participation in the iFixit technical writing program with appropriate registered student organizations and additional course projects.

GSLIS Team
The requested seed funding includes $40,319 to support a team from the Center for Digital Inclusion (CDI) at the Graduate School of Library and Information Science (GSLIS). GSLIS is the number 1 ranked program nationally and looks at the relationship between information, technology and people. To help fulfill this mission, the Center for Digital Inclusion considers the social impact of information and communication technologies on our society and communities.

The funding for the CDI/GSLIS team will support the following:
- CDI/GSLIS Research Scientist, Martin Wolske, PhD, will lead research and engagement activities to develop strategies for repair, reuse and responsible destruction of information and communication technology devices and equipment. One month of Dr. Wolske’s time is reflected in the project budget.
- The hiring of two graduate hourly assistants for project management and to help design and implement research for this project.
- Provide support for printing, software and transcription services ($1,750 listed under general supplies in the budget). A license for Survey Gizmo will be purchased to support survey data collection. Interviews with community stakeholders will be performed, recorded with a digital recorder and transcribed using a professional transcription service. This information will be necessary to perform a community needs assessment.

The GSLIS team will assist with developing a service system to fix, repair and dismantle electronic equipment. The GSLIS team has expertise in researching, design and implementing digital literacy programs. It has received over $600,000 in grant funding in the last 2 years to support the Digital Innovation Leadership Program and the Digital Literacy for All Program. Both are leadership development programs that teach UIUC students and community participants about the details of computer hardware, software and communication and its use in our daily lives. Martin Wolske has developed
a model known as Demystifying Technology. This crafts together lessons from design thinking and computational thinking to build a method for designing computer systems. As part of the Gadget Garage project, Dr. Wolske will extend the Demystifying Technology framework to extending the life of computer hardware and other electronic devices through repair, reuse and deconstruction. This approach will include working with stakeholders to conduct a community assessment of the needs for services to repair, reuse and recycle equipment. The GSLIS team will use the stakeholder alignment model developed by UIUC Professor Joel Cutcher-Gershenfeld, which has been used to determine stakeholder support for community green energy initiatives. The approach will help to identify needs for equipment recycling, the support or lack of support by community stakeholders, and the details of the types and levels of resources that stakeholders may be willing to contribute to support a community wide program. The team will collect data through surveys and focus group interviews. In terms of developing a service system to fulfill the goals of the project the GSLIS team will perform analysis on the expected demand for the service. Based on this information, a service model will be set up to meet demand. The team will determine the steps in the service process, develop an information system to collect data about the equipment and share the information with the public, train students, brand the process, and work with the rest of the project team and campus consortium members to develop a strategic plan to sustain the service.

How will the project improve the sustainability of the Illinois campus and how will the project go above and beyond campus standards?
The project will provide students and staff with a convenient, low-cost (or free, in the case of students) option for extending the useful life of their personal electronic products. While a system is in place to promote reuse and responsible recycling for University-owned devices, no such system exists for student and staff-owned devices. The Gadget Garage will help to fill part of this service gap by assisting and empowering students and staff to maintain and repair their devices, and by raising awareness of options for electronics recycling and donation among campus community members. Awareness of the impacts of electronics devices will be raised through the efforts of the Gadget Garage, fostering more sustainable attitudes and behavior related to electronics among the UIUC community. The project also ties sustainability considerations to experiential learning activities, which will help establish this campus as a place where sustainability isn’t simply one more discipline to which students and staff may align themselves, but an integral part of the campus culture and experience.

Where will the project be located? Will special permissions be required to enact the project on this site? If so, please explain and attach any letters of support at the end of the application.
The Prairie Research Institute space committee has located an under-utilized set of rooms within its footprint which may be suitable for the Illini Gadget Garage. This space consists of a main room of a little over 500 square feet, an adjacent work area of approximately 180 square feet, and adjacent office/storage space of approximately 500 square feet, for a total of approximately 1180 square feet. These rooms are in “Storage Building 3” (H27 on the map available at http://prairie.illinois.edu/pdf-files/institute-uc-map3.pdf). The Institute is currently in the process of reviewing an internal space assessment report, and hopes to determine whether this space can be allocated to the Illini Gadget Garage within the next month. If this space is made available by Institute staff, the Illini Gadget Garage may use it in exchange for a facility usage fee. An attached letter of support from the Institute confirms it is willing to work with the Gadget Garage project team to identify a suitable space, and its confidence that something can be found prior to the fall.

In the meantime, the project team continues to search for alternative spaces on campus, having contacted individuals at the FabLab and campus bike shop for suggestions and possible collaboration. After spring break, we will also solicit suggestions for possible spaces from the sustainable electronics campus consortium email list, maintained by ISTC (http://www.sustainelectronics.illinois.edu/services/campusconsortium.cfm). If we are able to find something more centrally located on campus for similar or less money than the proposed Institute space, then we will secure it instead.

As the Institute cannot firmly commit to providing the particular space described above at this point, and because space is a premium on campus, the project leader has researched prices for available office spaces off campus—something that would be pursued as a last resort to ensure that the Gadget Garage could have some space in which to begin its
operations, with plans to move as soon as suitable campus space became available. The Independent Media Center, where MakerSpace Urbana is located, currently has three rooms available, which together would total 437 square feet. Based on rental fees stated online at [http://www.ucimc.org/space](http://www.ucimc.org/space), these three spaces could potentially be rented for $7308/yr. While that would be a very small base of operations, being co-located with MakerSpace Urbana could allow for collaboration among the similar groups using both MakerSpace and Gadget Garage. Both groups would be inclined toward collaborative repair. Another 1100 square foot space, is listed online as being on the first floor of the Urbana Boneyard Office, near the Silvercreek Restaurant in Urbana (see [http://www.loopnet.com/Listing/18732157/208-W-Griggs-Urbana-IL/](http://www.loopnet.com/Listing/18732157/208-W-Griggs-Urbana-IL/)). Based upon the listed cost per square foot per year, that space could be rented for $7425/yr. That would not include utilities. Another building at 24 E. Green Street has two spaces available, with the more expensive option being available for $9324/yr. (see [http://www.loopnet.com/Listing/17980804/24-E-Green-St-Champaign-IL/](http://www.loopnet.com/Listing/17980804/24-E-Green-St-Champaign-IL/)).

Other than the project team, who will have a stake in the project? Please list other individuals, groups, or departments affiliated directly or indirectly by the project. This includes any entity providing funding (immediate, future, ongoing, matching, in-kind, etc.) and any entities that will be benefitting from this project. Please attach letters of commitment or support at the end of the application.

Beyond the project team, the following groups will have a stake in this project. An asterisk indicates a support letter is attached to the email submission of the project proposal:

- ifixit, through UIUC student participation in its technical writing program and online “fixer” community and through in-kind contributions of tools*
- HOBI International Inc., through provision of matching funds*
- The Prairie Research Institute, through its willingness to assist in finding, and possible provision of, operational space for the Gadget Garage*
- MakerSpace Urbana, through the provision of a soldering workshop at the Gadget Garage in fall 2015, through referrals by Gadget Garage staff/volunteers (if individuals who are not staff or students contact the Garage for assistance with electronics repair, or if people are interested in tools for repair/maintenance of non-electronic products). Gadget Garage staff/volunteers will also promote MakerSpace Urbana workshops that will teach skills of use to its clientele.*
- Members of the UIUC Sustainable Electronics Campus Consortium, who may benefit from collaborations emerging from meetings associated with the Gadget Garage project.
- Other “fixer” communities on campus (such as members of the bike shop) who may be interested in a place to work on maintenance and repair of additional products, and who could benefit from participation in the iFixit Technical writing program (which is not restricted to work involving electronic products). The Gadget Garage will set up a space dedicated to photography related to preparation of iFixit guides. This equipment, and advice on how the technical writing program could fit into their activities, could allow these other “fixers” to share their knowledge more broadly, further fostering a culture of repair and maintenance as opposed to disposal and replacement.
- Various registered student organizations with interests in computers, electronics, engineering, design, and STEM education. Some RSOs, such as Engineers Without Borders, could benefit from volunteering at the Gadget Garage and learning about both collaborative repair and about the creation of online repair guides. Imagine, for example, a student group helping a community set up a computer lab and preparing guides to assist with repair and maintenance of the equipment by community members in the future.
- Local businesses involved in electronic repair and recycling, which will benefit from Gadget Garage referrals.
- Local non-profits which may benefit from Gadget Garage referrals for donations of devices or components (e.g. the IDEA Store, Goodwill, etc.)
- “Maker” communities on campus (e.g. the FabLab) whose members are interested in product creation and prototyping. These individuals would also presumably be interested in repair and maintenance of their creations, and could benefit from the tools and resources which would be available at the Gadget Garage. These individuals might also learn lessons on designing for disassembly and repair to apply in their own creative projects through participation in collaborative repair and troubleshooting of existing devices at the Gadget Garage.
Please indicate how this project will involve or impact students. What role will students play in the project?

Students will be involved in the special topics course described above, and in the GSLIS team performing the community needs assessment and strategy development. Students may be involved in the UIUC Sustainable Electronics Campus Consortium, which will provide feedback and advice throughout the project period. Students may be clients of the Gadget Garage, bringing in their own devices for assessment and repair, and participating in those activities along with staff/volunteers at the Gadget Garage. Students beyond those involved in the special topics course might become involved with the Garage by volunteering their own time during times when the Garage is open to the campus community (TBD) to assist others in the collaborative repair process, as suggested above. This would be particularly true for students in registered student organizations or other groups related to industrial design, engineering, sustainability/environmental concerns, innovation, computer science, green business, etc. (e.g. IDSA, the Sustainability and Innovation Living Learning Communities, Engineers Without Borders, Design for America, IEEE student chapter, Students for Environmental Concerns, ActGreen, etc.). Student members of “maker” and “fixer” communities, as suggested above, could benefit from tools and activities at the Gadget Garage. Students can also participate in a soldering workshop to be presented at the Gadget Garage in mid-October (tentatively) by MakerSpace Urbana. Students interested in improving their technical writing skills and producing a real-world product that could be featured on their resume could use the Gadget Garage tools, equipment, and guidance to prepare repair guides for iFixit. Students interested in editing could improve the online iFixit guides written by other UIUC students, or by anyone, for that matter (regardless of participation in a class, anyone may prepare guides for the iFixit website and/or improve guides already published).

Have you applied for funding from SSC before? If so, for what project?

William Bullock was the project lead and Joy Scrogum was on the project team on a proposal submitted to SSC in 2011. That proposed project was similar to the Illini Gadget Garage concept, but focused on students repairing Prairie Research Institute (then the Institute of Natural Resource Sustainability) owned computers that would otherwise be sent to University Surplus. That proposal, called “Repurposing Campus E-waste,” was not funded. Joy Scrogum is currently on the project team for an SSC funded project called "UIUC Baseline Waste Characterization and Zero Waste Pilot Program."

Scope & Schedule

What is the plan for project implementation? Describe the key steps of the project including the start date, target completion date, target date for submitting a final report, and any significant tasks or milestones in the table below. Please be as detailed as possible. Insert additional rows if necessary.

<table>
<thead>
<tr>
<th>Task</th>
<th>Timeframe (start date; # of weeks to completion)</th>
<th>Estimated Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finalize syllabus for special topics course (lead by William Bullock)</td>
<td>June 1, 2015; 6</td>
<td>July 13, 2015</td>
</tr>
<tr>
<td>Locate and secure operational space</td>
<td>Ongoing; 14</td>
<td>July 6, 2015</td>
</tr>
<tr>
<td>Regular campus consortium meetings (advisory; continuous, monthly or every other month)</td>
<td>June 1, 2015; 52</td>
<td>May 30, 2016</td>
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<tr>
<td>Marketing &amp; solicitation of further donations (continuous)</td>
<td>June 1, 2015; 52</td>
<td>May 30, 2016</td>
</tr>
<tr>
<td>Engagement of student and staff/outreach (continuous)</td>
<td>June 1, 2015; 52</td>
<td>May 30, 2016</td>
</tr>
<tr>
<td>Acquire tools, workbenches, equipment etc. for Gadget Garage (beyond donations made by iFixit)</td>
<td>July 6, 2015; 4</td>
<td>August 3, 2015</td>
</tr>
<tr>
<td>Event Description</td>
<td>Start Date</td>
<td>End Date</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Provide special topics course (includes students writing iFixit guides &amp; suggested marketing/business plan)</td>
<td>August 24, 2015; 16</td>
<td>December 18, 2015</td>
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<tr>
<td>Search for and hire student hourlies for course</td>
<td>June 1, 2015; 9</td>
<td>August 3, 2015</td>
</tr>
<tr>
<td>Search for/hire GSLIS student hourlies</td>
<td>June 1, 2015; 9</td>
<td>August 3, 2015</td>
</tr>
<tr>
<td>Open Gadget Garage (at minimum to students in special topics course; opening to broader student/staff audience may be later, TBD in conjunction with GSLIS research plan &amp; campus consortium)</td>
<td>August 24, 2015; 1</td>
<td>August 27, 2015</td>
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<td>MakerSpace Urban soldering workshop</td>
<td>October 17, 2015; 0 (tentative)</td>
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<td>Garage closed for Thanksgiving</td>
<td>November 24, 2015; 1</td>
<td>November 30, 2015</td>
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<td>Midterm progress report to SSC</td>
<td>November 30, 2015; 0</td>
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<td>Garage closed for winter break</td>
<td>December 18, 2015; 3</td>
<td>January 19, 2016</td>
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<tr>
<td>Garage closed for spring break</td>
<td>March 18, 2016; 1</td>
<td>March 28, 2016</td>
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<td>GSLIS needs assessment</td>
<td>August 24, 2015; 16 (estimate; subject to change based on input from GSLIS)</td>
<td>December 18, 2015</td>
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<tr>
<td>Development of service model based on needs assessment</td>
<td>January 19, 2016; 4 (estimate; subject to change based on input from GSLIS)</td>
<td>February 16, 2016</td>
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<tr>
<td>Alter Gadget Garage service to reflect informed model</td>
<td>February 22, 2016; 1</td>
<td>February 26, 2016</td>
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<tr>
<td>Analysis of feasibility of continuation of Garage beyond initial year/preparation of recommendations for logistics &amp; operations</td>
<td>April 17, 2016; 5</td>
<td>May 22, 2016</td>
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<tr>
<td>Close Garage for intersession</td>
<td>May 13, 2016; TBD</td>
<td>TBD (continuation of Garage beyond first year will be determined)</td>
</tr>
<tr>
<td>Final report to SSC</td>
<td>June 1, 2016; 0</td>
<td>June 1, 2016</td>
</tr>
</tbody>
</table>

If the project is implemented, will there be any ongoing funding required? What is the strategy for supporting the project in order to cover replacement, operation, or renewal costs? (Note: SSC provides funding on a case by case basis and should not be considered as an ongoing source of funding)

As mentioned previously, while students will be able to use the Gadget Garage for free, UIUC staff will be charged an annual membership fee to use the Garage and its resources, which will be put toward operations. Based upon feedback and information obtained from campus consortium members, the suggested marketing/business plan developed as part of Professor Bullock’s course, and information from the GSLIS investigations, at the end of the project period it will be determined whether students should also be charged a membership fee in the future.

As noted in its support letter, ISTC is willing to provide matching funds this year, contingent upon receipt of seed funding from SSC. Some of these matching funds are from the SEI Various Donors Fund, established with the UI Foundation to accept donations for the educational activities of the Sustainable Electronics Initiative (see the “support SEI” link at [http://www.sustainelectronics.illinois.edu/](http://www.sustainelectronics.illinois.edu/)). The project leader will continue to solicit donations from individuals and organizations to support SEI. If the final assessment and recommendations prepared for the future of the Garage,
prepared as part of the final report to SSC indicates the Garage could feasibly operate in the future, then ISTC leadership may approve the transfer of any “unspeciﬁed” funds from the SEI Various Donors Fund to the Garage in subsequent years, depending upon the need to support other SEI related activities at that time. Interested parties may also be instructed to include “special instructions” on their donation form for the SEI Various Donors Fund, indicating their donation is designated to support the Illini Gadget Garage. It may also be possible to set up a separate UI Foundation fund speciﬁc to the Gadget Garage, with suggested sponsorship levels. HOBI International already asked for such suggested levels in conversations with Joy Scrogum regarding sponsorship. The following levels were suggested: Friend: $25-$99; Bronze: $100-$499; Silver: $500-$999; Gold: $1000-$2499; Diamond: $2500 -$4999; and Platinum: $5000 or more. HOBI has committed to “diamond” level sponsorship as match if seed funding is obtained (see attached letter of support).

During Garage operations, donations will be accepted from clientele to support the Garage, even though the use of the center will be free for students and free to staff after annual membership dues. This is similar to what museums and other non-proﬁts do in conjunction with free admission. The project team may also develop a “wish list” of equipment and consumables to support the Garage’s continued operations, which could be posted on the Garage web page (which will at least initially be housed on the SEI web site). This is again similar to what many non-proﬁts and similar campus service organizations do (see http://publish.illinois.edu/wildlifemedicalclinic/wish-list/ for an example).

Public workshops, similar to the soldering workshop being offered in fall 2015 with MakerSpace Urbana, could be held in the future to teach basic repair skills, provide computer maintenance tips, teach about the impacts of electronics or issues like sustainable electronics purchasing, or assist people with speciﬁc repair activities (e.g. replace your cracked iPhone screen). The soldering workshop this fall is being held for free with the cost of materials covered in the requested funds from SSC ($120 in the budget), but future workshop might require a registration fee to cover necessary materials plus a small amount to support the Garage’s continued operation. The Gadget Garage could also open its doors to members of the public beyond the campus community, or for speciﬁc community organizations/groups for special “electronics repair fair” events (see http://fa.oregonstate.edu/recycling/events-and-opportunities/repair-fairs) in exchange for a small fee paid by the interested community group.

Fundraising activities related to electronics and recycling might become part of the operations of the Garage. Organizations like Funding Factory (http://www.fundingfactory.com/programs/recycling/) and TerraCycle (http://www.terracycle.com/en-US/brigades/e-waste-brigade.html) support fundraising activities for schools, universities, and other organizations tied to the collection of items for recycling and reimbursement. A student group within the UIUC College of Business is already collecting and recycling printer cartridges via Funding Factory, for example (http://wp.istc.illinois.edu/sei/2014/09/26/). Such activities would further foster the sustainability of our campus and positive environmental behavior among students and staff. Other recycling-related fundraising activities that could beneﬁt the campus community might include the acquisition of a device to recycle plastics (from broken electronics, 3D print scraps or other sources) into new 3D printing filament (e.g. http://www.filabot.com/ or http://www.redetec.com/). The Garage could charge a fee for the use of such a machine or use the machine and sell the resulting ﬁlament. A reuse related fundraiser could entail acceptance of donated electronic devices for student preparation of iFixit repair guides. Upon completion of the guide, the donated device, having been reassembled and returned to proper working condition by students, could be sold to community members at a discount. Non-recycling related fundraising activities, such as the sale of t-shirt or other items with an Illini Gadget Garage logo, or crowdsourcing campaigns (e.g. Kickstarter) could be employed to support future operations. The details of any and all above suggestions, including any legal considerations, would need to be determined along with the campus consortium and other campus stakeholders as part of the final feasibility assessment and report to SSC.

Additionally, the project team will also apply for other relevant sources of funding to continue the operations of the Garage beyond its inaugural year (e.g. the Graduate College’s Focal Point program, Office of Public Engagement Grants, etc.).
Please include any other sources of funding that have been obtained or applied for, and please attach any relevant letters of support.

Contingent upon receipt of seed funding from SSC, ISTC has committed to provision of $10,000 of matching funds, to help cover salary needed beyond the amounts noted in the requested budget, or other operational expenses. ISTC will also provide the in-kind contribution of creation and maintenance of an initial web presence for the Gadget Garage via a page on the SEI web site. HOBI International Inc. has committed to supporting the Garage at the $2500 - $4999 if seed funding is obtained. iFixit will provide an in-kind contribution of tools for the center, at a total estimated value of $2110. MakerSpace Urbana has agreed to provide a soldering workshop at the Garage for the cost of participant materials alone ($120 included in requested budget); their staff time is donated. The funds for William Bullock’s special topics course included in the requested budget are for student hourly assistants and course materials; his time is being donated. Relevant support letters will be attached to the email submission of this proposal.

Environmental & Economic Impacts

Which aspects of sustainability will the project address, and how? Does the project fit within any of the iCAP goals? If so, how does the project go beyond university status quo standards and policies?

This project addresses iCAP waste reduction goals through repair and product life extension, as well through education by raising awareness of the state electronics landfill ban, responsible recycling and donation options, and the need to extend the useful life of electronics to offset negative impacts associated with their production (e.g. mining, embedded energy, factory working conditions, etc.). The project fosters the incorporation of sustainability into the mindsets of students and staff beyond those in environmentally related disciplines by tying sustainability to something that everyone experiences—the need to repair or maintain the electronic devices ubiquitous in our lives. The project certainly supports iCAP education goals related to sustainability learning outcomes and development of experiential learning sites. This project goes beyond the status quo by extending such experiences to staff as well as students, and extending the reach of experiential learning activities beyond the campus though participation in iFixit’s online repair guide community. The project has already supported the iCAP goal of seeking donations for campus sustainability efforts, through matching and in-kind contributions from HOBI and iFixit. The project also addresses economic aspects of sustainability to some degree by assisting students and staff in saving money by extending the useful life of products they already own, reducing the need for the purchase of replacement devices. This illustrates that sustainable behavior can be economically beneficial as well as environmentally beneficial.

Please include any other sources of funding that have been obtained or applied for, and please attach any relevant letters of support.

See above under “Scope, Schedule and Budget Verification.”

Please estimate the greenhouse gas impact this project will have, if applicable. Use the University of Illinois at Urbana-Champaign Energy Management website (click here) to determine the cost of energy on campus and the following chart to determine GHG emissions.

Without knowing how many devices might be saved from replacement or recycling by the operations of the Gadget Garage, it is difficult to accurately estimate potential greenhouse gas emissions. The US EPA Electronic Environmental Benefits Calculator (EEBC), Version 3.1, July 2012 (http://www2.epa.gov/fec/publicationsand-resources#calculator) allows benefits to be calculated in a variety of behaviors including electronics reuse, which may be treated as the equivalent of an individual repairing his or her device for their own continued use. If one assumes that at least 10 notebooks and 10 mobile phones are kept in useful service by Garage activities over the course of the funded year (setting aside any recycling that may take place because of the Garage and the benefits from that), according to the EEBC, this would result in greenhouse gas reductions equivalent to removing 1.53 passenger cars from the road per year. Consider that additional numbers and types of devices may be kept in service as the result of the Garage. Further consider that in 2014 during the campus “E-cyclemania” event, two 26 ft. box trucks were filled with electronics for recycling (https://icap.sustainability.illinois.edu/project-update/e-waste-collection-results). It is unknown how many of those devices might have been able to be reused with minor repairs, which might have been performed if a service like the Gadget Garage were available on campus. It is easy to see that there will be some positive impact on GHG emissions through the operation of the Garage, and to imagine that these impacts could be significant.
How will impacts be measured in the near and long term? Will there be metering or survey strategies to track outcomes and progress?
Impacts will be measured through tracking the number of people served and devices serviced, as well as the number of devices successfully repaired. Number of referrals to local repair and recycling businesses and donation opportunities will also be tracked, as well as the number or weight of devices and components recycled by the Garage itself as the result of regular operations and any recycling-related fundraising activities. These statistics can be used in conjunction with the aforementioned EEBC to estimate associated benefits such as the reduction in GHG emissions, energy use, toxic materials, solid waste and hazardous waste. The number of iFixit guides written and published online as the result of Garage activities will also be tracked; usage stats for those guides could serve as a gauge for educational impacts beyond the UIUC campus (for example, see the “view statistics” listed at the bottom of the Samsung S85 guide written by UIUC students in ENG 498 during spring 2014, https://www.ifixit.com/Device/Samsung_S85). Online and onsite (paper) feedback forms will be made available for Garage clients and the campus community to report satisfaction with services and changes in attitude or awareness resulting from the use of the Garage and interaction with staff/volunteers.

What is the plan for publicizing the project on campus? In addition to SSC, where will information about this project get reported?
As indicated previously, a page will be created on the SEI web site (www.sustainelectronics.illinois.edu) for the Gadget Garage. The Garage will be promoted via the SEI blog, Facebook, and Twitter accounts, and may also be promoted via the ISTC blog and social networks. The Garage may have its own social networking accounts established as well (TBD with campus consortium and in conjunction with GSLIS strategy and service development). Funding for marketing and outreach reflected in the requested budget will cover ads in campus publications (e.g. the Daily Illini, Technograph, Inside Illinois, etc.) and on radios stations such as WPGU. These funds will also go toward flyers to be posted or set out around the campus community (e.g. at the bike shop, FabLab, on bulletin boards in various campus buildings, etc.) and at appropriate off-campus sites frequented by UIUC students and staff (e.g. the Independent Media Center, public libraries, etc.). Videos about the Garage might also be produced by student volunteers or as part of associated course work or RSO special projects, which could be posted to the SEI YouTube channel and other appropriate channels for promotional purposes. Events associated with the Garage (such as the MakerSpace Urbana soldering workshop, open hours, etc.) will be posted on the SEI web site calendar and Facebook page, and submitted to the iSEE sustainability calendar, EWeek, Office of Public Engagement, and campus calendars. Announcements related to the Garage will be submitted to EWeek (http://publicaffairs.illinois.edu/resources/eweek.html), the Engineering Update (http://engineering.illinois.edu/student-life/engineering-update/) and other appropriate publications. The project leader will work to get coverage of the Garage by the Illinois News Bureau, Daily Illini, and other local news outlets. Additional marketing and outreach activities may emerge from the marketing/business plan developed in Professor Bullock’s special topics course, suggestions from the sustainable electronics campus consortium, and stakeholder engagement and needs assessment conducted by GSLIS.

What are your outreach goals and how can they be measured?
As stated previously, we hope to raise awareness of electronics legislation, recycling, repair and donation options, and techniques to maintain and extend the useful life of devices. We also hope to decrease misconceptions regarding the disposability of devices and prohibitive complexity of electronics repair and maintenance, and raise awareness for the need for product life extension by raising awareness of environmental and social impacts of electronics throughout their product lifecycles. These outcomes may be measured through online and onsite feedback forms, class evaluations from students enrolled in Professor Bullock’s special topics course, and through stakeholder interactions conducted by GSLIS. Also, usage statistics for iFixit guides produced by UIUC students can provide a gauge for the educational impacts beyond the campus community.