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### **Fab Lab Locations, Structures, and Floor Plans**

Last month *Tulsa Engineer* began a series of monthly articles that intend to describe the efforts of local Tulsa volunteers to open a public MIT fabrication laboratory (Fab Lab) in the Kendall-Whittier Neighborhood. This month's article will briefly describe what existing labs look like and present some of the work the Tulsa Fab Lab team has accomplished to plan Tulsa's future lab space.

The roughly 35 labs in existence today occupy most environments one can imagine. International labs include the Lyngen, Norway lab above the Arctic Circle, the Majiwa, Kenya lab on the eastern shores of Lake Victoria, the Pabal, India lab in hot, tropical western India, and the Afghanistan lab near Jalalabad and the Khyber Pass. Domestically, Fab Labs are located from MIT in New England to Ohio and Wisconsin in the Midwest to San Diego in southern California. There are presently no MIT Fab Labs in Oklahoma or in any state bordering Oklahoma. The Tulsa lab would be the first lab to serve the south central part of the U.S.

MIT Fab Labs share a few general physical characteristics besides the equipment they contain. The labs are generally not very large and are many times contained in just one or two rooms. This characteristic is an asset and arises from selection of multifunction, computer-controlled, space-saving machinery. Small space requirements have the benefits of facilitating transportation and lab setup, additional space for lab patrons, reduced building demands, and ultimately lower overhead costs, thus making labs accessible to nearly anyone, anywhere in the world. Fab labs generally contain several common types of workspaces including computer-controlled machinery and computer workstation space, electronics assembly space, group meeting space, and craft / general fabrication space. In most cases these spaces overlap.

Other characteristics of Fab Labs include their cleanliness and their versatility. Unlike what one might imagine a traditional machine shop to look, sound, and smell like, Fab Labs are generally very comfortable spaces. The interiors are well lit, well organized, well furnished, and use filtration equipment to ensure good air quality. Lab interiors many times more closely resemble a computer lab or creative design space with computer-controlled machinery sharing the same room. Their welcoming interiors help labs attract those individuals who might otherwise be intimidated or turned off by traditional machine shops and thus help labs serve a wider and more diverse audience.

Lab spaces often exceed their primary role as fabrication and production spaces and serve as classrooms, meeting spaces, and places to socialize. In the case of the Lyngen Fab Lab, the site's facilities were designed to include guest lodging. The adaptability of Fab Labs is demonstrated in the wildly disparate settings and environments in which they have found homes.

There is no standard structure that can describe all Fab Labs just as there is no standard lab floor plan. Most labs move into an already existing local property with very little renovation, while several labs are located within college and university campuses (such as MIT, Wisconsin, and Ghana ), and at least in the case of the Lyngen lab a custom, purpose-built collection of building were constructed to house their lab. The most unusual setting for a Fab Lab to date has been a 32 foot long by 8 foot wide trailer that contained a mobile lab which has crisscrossed the United States.

The Tulsa Fab Lab team has already conducted two studies into the space requirements of a local lab. The first study was conducted to determine the minimum floor space necessary to house a standard equipped Fab Lab. The team researched existing lab spaces, equipment footprints, and minimum working space requirements while considering functionality, comfort, and productivity. The result of this study was a 1000 square foot conceptual minimum floor plan of a standard equipped Fab Lab. It is estimated that this lab could host up to 15 patrons at one time.

The second study considered Kendall Whittier neighborhood which would host the Tulsa lab and its available resources. The team surveyed statistics of more than 300 commercial properties to determine the typical size of structures suited to house the lab. Most structures exceeded the minimum space requirements calculated earlier and the team selected a conservative value that fell towards the lower end of frequently observed interior floor areas. The result of this study was a 2500 square foot conceptual Fab Lab floor plan. This lab could potentially serve twice the number of patrons as the minimal lab at one time while permitting workspace partitioning and expanded lab capabilities from additional equipment space. Ultimately the final appearance of a Tulsa Fab Lab will depend on the particular structure selected by the team.

Currently the Tulsa Fab Lab team is examining several Kendall-Whittier neighborhood properties in detail to quantify their suitability for the Tulsa Fab Lab.

For a current list of the MIT Fab Labs already in existence visit the website: <http://fab.cba.mit.edu/about/labs/>. To contact the Tulsa Fab Lab team send e-mails to the following address: [FabLab@kendallwhittier.org](mailto:FabLab@kendallwhittier.org)