

LabRATS in the University of California

Laboratory Research and Technical Staff (LabRATS) is a programme, founded in 2006, to improve laboratory sustainability at the University of California, Santa Barbara (UCSB) which has now spread to other US campuses. It brings together researchers, administrators, facilities staff, and student interns, and has latterly had a full-time post at UCSB, co-funded by a number of internal units and research projects. LabRATS' activities (many funded from a voluntary student environmental levy) include:

- *Laboratory assessments*, conducted by student interns, which examine current activities, identify improvement opportunities, and provide support for implementation (S-Lab has adapted this process for UK universities).
- *Reuse* – internal websites which enable this for surplus equipment, chemicals, supplies, and furniture.
- *Fume cupboards* – encouraging (e.g. through free pizza) switch-off of fume cupboards with dedicated fans, and sash closure of variable air volume cupboards (saving up to \$2000 of energy costs a year), when not in use.
- *Lighting* – minimising this by encouraging researchers to evaluate how much they need, making switches easier to understand, and removing bulbs in overlit public areas.
- *Equipment* – demonstrating the environmental and financial benefits of energy and water efficient models e.g. of autoclaves, fridges and freezers, and vacuum pumps.

UCSB Sustainability Co-ordinator (and LabRATS co-founder) Katie Maynard believes that “LabRATS offers information and tools to researchers to reduce their environmental impact, increase safety, reduce financial costs, and enable quality research. We also found that rewards can help. The National “Freezer Week” campaign we’ve launched in conjunction with UC Davis, UCLA, Harvard, University of Colorado, Boulder and University of Pennsylvania motivates researchers to optimize their cold storage use through financial incentives and free pizza while providing relevant information to ensure their success.” UCSB LabRATS Co-ordinator, Dr. Amorette Getty (a former postdoc at a university lab) adds that “LabRATS also transfers best practice from one area to another, for example, publicising the most water-efficient methods of cleaning glassware, which is filling and dumping, rather than swilling.”



Dr. Allen Doyle

Key Points

- LabRATS began at UCSB as a bottom up improvement programme, and has spread and been endorsed by senior leadership because of the environmental, financial and science benefits it creates.
- Stanford University hopes to save millions of dollars in energy costs by optimising storage of its 50 million biological samples, 25% of which could make use of a new room temperature DNA and RNA storage technology.
- Modest incentives can catalyse behaviour change amongst lab staff and students, greatly reducing energy, materials and water use and costs, e.g. in fume cupboards.
- LabRATS is encouraging more researcher input into design and operational decisions which influence lab energy, e.g. relaxed temperature settings.

S-Lab Case 10 – Sustainable Labs in California

Energy Efficient Sample Storage at Stanford University

In 2008 Susan Kulakowski-Vargas, Demand Side Energy Manager in Stanford's Department of Sustainability and Energy Management (DSEM), established a pilot programme in 11 laboratories to identify opportunities to make sample storage more sustainable. This found that the University stored around 50 million biological samples, using 11.6 million kwh of energy, and creating \$5.2 million of operating costs, a year. Much of this was associated with a fleet of over 2000 freezers, which take up 10% of all wet lab floor area and whose numbers have grown by 5% annually. The programme also stimulated practical actions to clear out unwanted samples, to ensure that those needed for five years or less were stored in -20°C (rather than -80) freezers, and to successfully trial dry, room temperature storage of DNA and RNA samples. The latter uses a proprietary technology to replace water with a synthetic compound, 'biomimicking' the replacement of water by sugar which allows brine shrimp, spores and seeds to preserve their DNA, protein and membranes for long periods in desert conditions. The success of the pilot led to the provision of financial support for the replacement of old freezers with new, energy efficient, models (with \$185,000 being funded in 2010), and/or the transfer of samples to room temperature storage. The funding will be recovered from the ongoing energy savings.



Susan Kulakowski-Vargas

Views

"LabRATS has shown that environmental improvement can save millions of dollars in large university, without any negative impacts on safety or effectiveness. There are many motivated people on most campuses. They just need inspiration, networks and good tools to help them make a difference."

Allen Doyle, co-founder LabRATS, now Sustainability Manager, UCD

"20-25% of the total Stanford sample collection could be moved from freezers to room temperature technology, with a 3-5 year payback and avoidance of over 17,000 tons of CO₂ emissions over the next decade. Transferred samples will also be less vulnerable to degradation due to power disruptions, and thousands of square feet of lab space could be liberated for better use."

Susan Kulakowski-Vargas

Green Alcohol at University of California, Davis (UCD)

The Robert Mondavi Institute for Wine and Food Science is a \$20 million, LEED Platinum certified complex containing the Busch Brewing and Food Science Laboratory and a teaching-and-research winery. This complex reduces UC Davis' impacts and showcases energy and water efficiency for industry. Key features include photovoltaic cells providing excess power on average, rainwater capture and use, processing water re-use, CO₂ capture, recycled glass in flooring, and interior panelling recovered from a 1928 wooden aqueduct. The Jackson Sustainable Winery Building is in design at this time with further conservation measures.

Further Information: www.goodcampus.org; LabRATS :<http://sustainability.ucsb.edu/LARS/>
Stanford sample management: http://sustainablestanford.stanford.edu/energy_initiatives
UC Davis Robert Mondavi Institute: http://www.youtube.com/watch?v=FXM-HGLv2_M

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