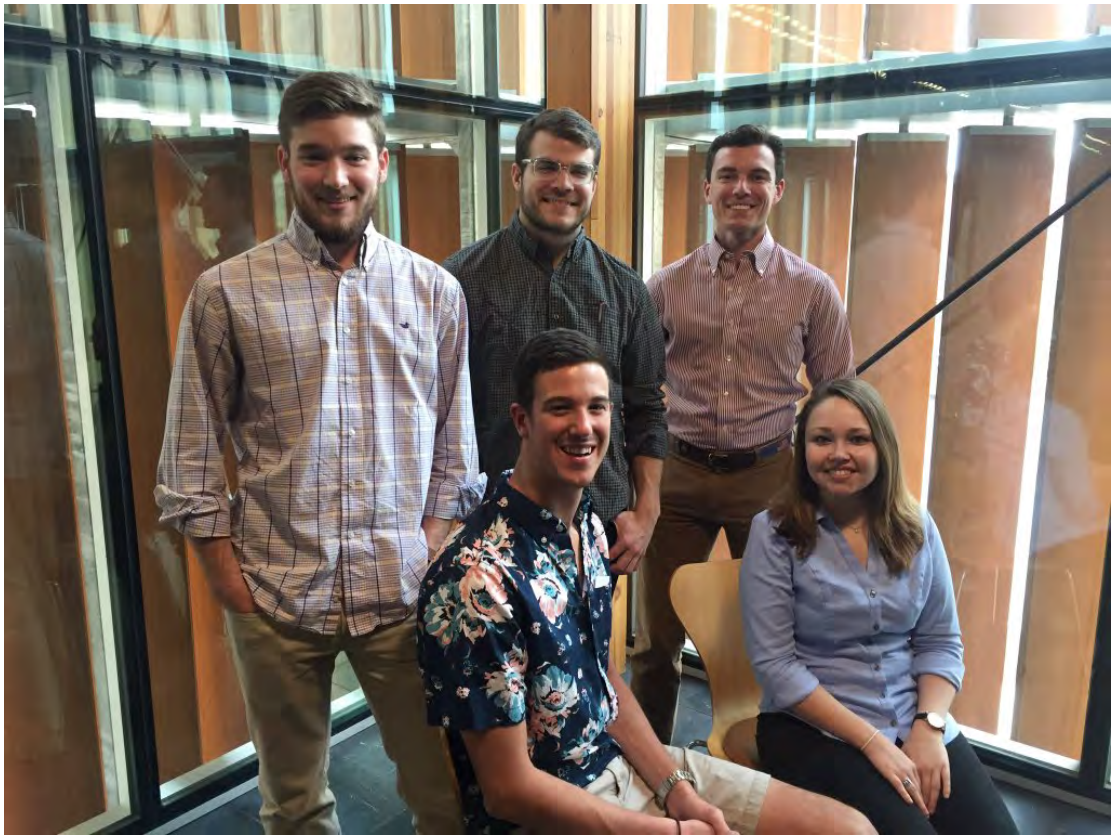


KU HUD Competition team: (clockwise from upper left) Doug Dawson, Ryan Lyssy, Colin Thomas, Katie Beckwith, Culin Thompson

KU student team named finalist in HUD Housing Competition

April 20, 2016

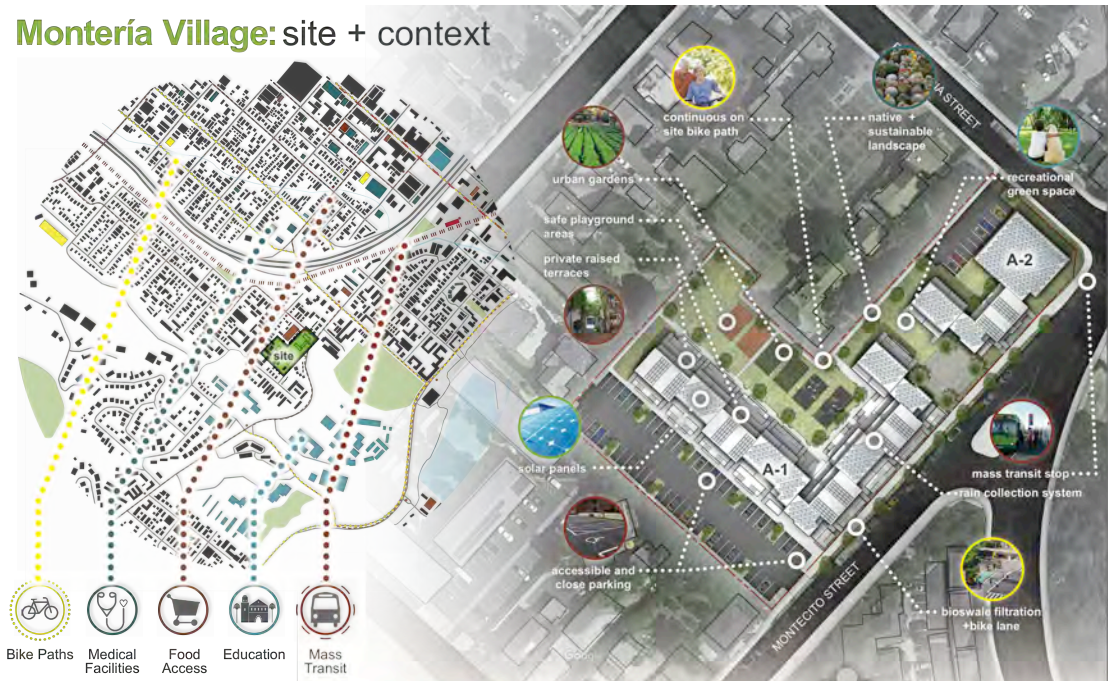
Lawrence - A team of multidisciplinary graduate students at the University of Kansas has been named to the Final Four in the national Innovation in Affordable Housing Student Design and Planning Competition sponsored by the U.S. Department of Housing and Urban Development (HUD).

“Improving affordable housing is critical to HUD’s mission, which involves providing every American access to safe and stable housing. HUD has set up this competition to create strong, sustainable, inclusive communities and quality affordable homes,” HUD secretary Julián Castro said in a statement. “We are trying to tap the talents of top young people across the country,” Castro said.

This year’s competition challenged students to redesign Monteria Village, a family housing development, for the Housing Authority of Santa Barbara, California. Submittals required both designs and a development pro forma utilizing HUD’s Rental Assistance Demonstration (RAD) financing program. HUD flew finalists to visit the site in March and to HUD Headquarters in Washington, D.C. to present their final designs in April. In addition to KU, selected finalists included teams from Harvard University, the University of Texas at Austin, and the University of

Maryland. This is the second year in a row KU has been invited to the shortlisted group presenting in Washington.

The KU team includes Katie Beckwith (Perry, Kansas), Doug Dawson (Austin, TX), Ryan Lyssy (Lenexa, Kansas), Culin Thompson (Chicago, Illinois), and Colin Thomas (Baldwin City, Kansas). Associate Professor Joe Colistra is the faculty advisor. The team developed a solution that not only catered to the existing families on site but recognized the benefits of creating a project where older residents could thrive as well.

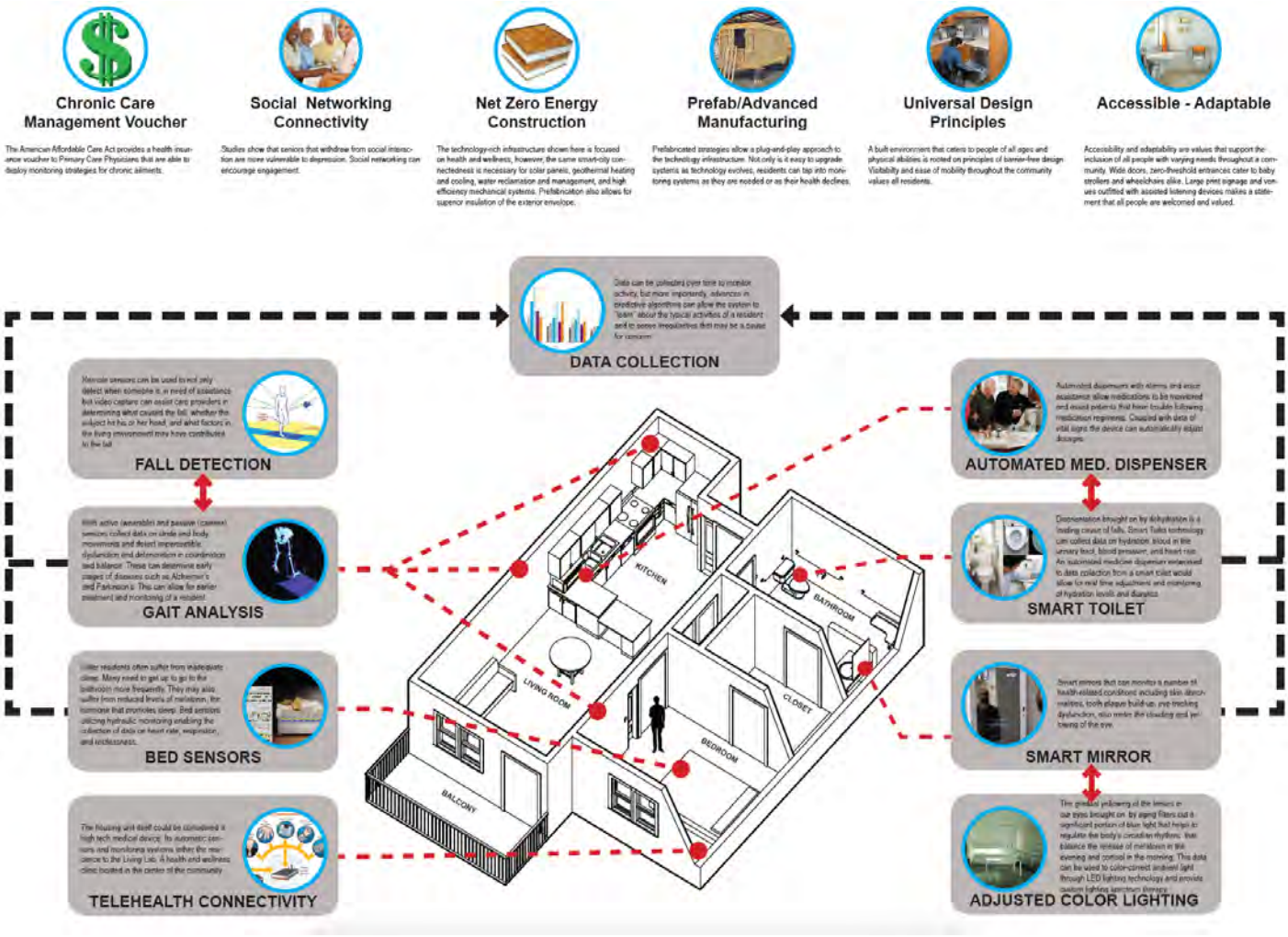


Site Plan

The solution balances increased density with open spaces that allow for social connectivity, exercise areas, playgrounds, and a community garden. The addition of senior housing to the project creates an inclusive community where young families could utilize the support network an intergenerational neighborhood affords.

Interspersed with family units, the senior prototype units were designed to meet accessibility codes and universal design standards. They also proposed technology-rich health and wellness strategies such as:

Motion Sensors/Fall Detection Motion sensors can be used to not only detect when someone is in need of assistance after a fall but video capture and rewind functions can assist care providers in determining what caused the fall, whether the subject hit his or her head, and what factors in the living environment may have contributed to the fall. Data can be collected over time to monitor activity, but more importantly, advances in predictive algorithms can allow the system to "learn" about the typical activities of a resident and to sense irregularities that may be a cause for concern.



Senior prototype unit

Gait-Analysis and the Built Environment Both active (wearable) and passive (camera) sensors collect data on stride and body movements and detect imperceptible dysfunction and deterioration in coordination and balance. Advances in predictive algorithms can determine early stages of diseases such as Alzheimer's and Parkinson's. This can allow for earlier treatment and monitoring of a resident. Data collected by force-plates in the floor structure monitor sway and balance over time and can be used to predict and prevent falls.

Smart Toilets Disorientation brought on by dehydration is a leading cause of falls. Smart Toilet technology can collect data on hydration, blood in the urinary tract, blood pressure, and heart rate. This newer generation of technology-enhanced toilets can collect the necessary data that can alert care providers and physicians of potential problems.

Smart Environments for Geriatric Pharmaceuticals Automated medicine dispensers assist in regulating a patient's dosage schedule. Voice-assist units remind residents when to take their medication. It also reminds them when a scheduled dose has already been taken. One example of the potential networking of these technologies is found in the dispensing of diuretics. Often taken in combination with heart and blood pressure medication, diuretics allow the body to expel unneeded water and salt through urine allowing the heart to work more efficiently. An

automated medicine dispenser networked to data collection from a smart toilet would allow for real time adjustment and monitoring of hydration levels and diuretics.

Sleep Sensing Older Americans often suffer from inadequate sleep. Many need to get up to go to the bathroom more frequently. They may also suffer from reduced levels of melatonin, the hormone that promotes sleep. Bed sensors utilizing hydraulic monitoring provide a balistocardiogram enabling the collection of data on heart rate, respiration, and restlessness.

Automated LED Smart-Spectrum Lighting The gradual yellowing of the lenses in our eyes brought on by aging can filter out a significant portion of blue light that helps to regulate the body's circadian rhythms that balance the release of melatonin in the evening and cortisol in the morning. The resulting imbalance is believed to play a major role in many of the conditions one associates with aging: memory loss, slower reaction time, insomnia, and even depression. Smart mirrors that can monitor a number of health-related conditions (including skin abnormalities, tooth plaque build-up, eye-tracking dysfunction) also meter lens yellowing. This data can be used to color-correct ambient light through LED lighting technology and provide custom lighting spectrum therapy.

These health and wellness strategies are monitored at an on-site Living Lab and Family Opportunity Center. In addition to community center functions, the facility includes a state-of-the-art research facility that can monitor resident health and wellbeing. Students mapped nearby research institutions and proposed partnerships with universities that could leverage grant funding and other institutional resources. The Housing Authority is able to subsidize advanced technology by securing above-market rents for the lab space.

The team proposes that many of the telehealth systems qualify for Chronic Care Management Vouchers under the Affordable Care Act introducing an innovative new potential funding stream for affordable housing that is health and wellness-centered. This increased revenue also supports the innovative sustainability strategies that allow the complex to operate at net-zero energy. The facility utilizes both passive and active sustainable features such as shading devices, cross ventilation, photovoltaics, on-site water collection and filtration, home automation systems, and ground source heat pumps. The team also proposed unit configurations that lend themselves to prefabrication. Super-insulated wall panels are shipped to site with a fluid applied vapor barrier allowing the building envelope to meet stringent Passive House energy standards.