



UBC Smart City Prospectus

September 2024

UBC Department of Civil Engineering
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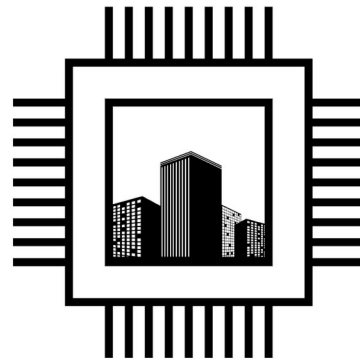
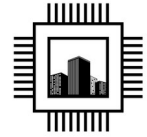


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Mission Statement

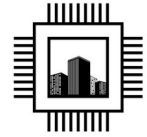
We are an interdisciplinary group of engineering students interested in finding answers to the questions nobody is asking yet. A plethora of new technologies have emerged over recent years, but application into our urban infrastructure have been slow. Our mission is to coordinate and support engineering students to materialize their visions that will undergird the success of tomorrow's cities. It is our goal to motivate, challenge, and equip students with the necessary skillsets to springboard them into their engineering careers.

We believe major technological breakthroughs and sociopolitical developments have the potential to change the landscape of cities and towns in the coming decades. Environmental uncertainty like rising sea levels may force us to redesign our coastlines. 3D printing may force us to reconsider the logistics of material transportation. Energy scarcity and volatility may force us to rethink the infrastructure we depend on, becoming more brittle as it ages. Interdependent and interconnected cyberspace may force us to redevelop security measures of tomorrow's digital urban framework. Climatic shifts causing population movements may force us to reclaim new geographies and design habitats where nature complements human settlement. Readily available data from sensors around the home may force us to readjust our daily routines to an improved quality of life. If you are more ambitious, renewed interest in space exploration may even force us to re-envision how Martian outposts look like and function. This team will build the next generation of talent through hands-on, project-based work resulting in designs to be demonstrated at competitions.

Objectives

1. Envision tomorrow's cities and towns and help students materialize them in the future.
2. Find innovative solutions to problems faced by cities around the world.
3. Introduce advanced data analysis, modeling, and artificial intelligence skills to students.
4. Build industry connections to support talent acquisition.
5. Develop a culture of excellence.

“Finding answers to the questions nobody is asking yet.”



Guidelines

Membership

Code of Conduct

All members of the team are expected to strictly adhere to UBC's Student Code of Conduct. Engineering students on the team will be expected to strive to embody the characteristics found in the EGBC Code of Ethics that go above and beyond the UBC Student Code of Conduct. Any members reported to be in violation of the UBC Student Code of Conduct will have a one-on-one meeting with the captain to discuss the claim. If a student is found to be in violation, the captain will work with the faculty advisor to report the violation to the appropriate university office.

Upward Mobility

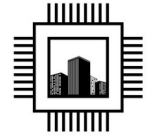
The team strives to provide upward mobility for all of its members. Students who join will have the opportunity to move upwards to more challenging roles or horizontally to develop new skillsets.

Recognition is not tied to the title of any role. A student on the team who demonstrates excellent technical or interpersonal leadership will have the opportunity to showcase their work just as any other member will. Strong performance is strong performance and credit will be given accordingly.

As the team attracts industry partners, students will also have the career advantage of having their skills and experience verified by being a part of the team. Excellent projects will be showcased in our end of year progress report to funding partners.

Midterms/Finals

Since everyone on the team is a student at UBC, the team will try its best to create project schedules that are flexible around midterms and zero commitment during finals. All members must maintain or improve their academic standing throughout the year—contribution to the team cannot come at the cost of one's grades.



Recruitment

Executive Team

Process

Any team member may nominate themselves as a candidate for an executive role. The executive team for each subsequent year is to be selected by the incumbent executive team. Incumbent executives must use their knowledge of the role requirements, as well as each candidate's demonstration of their abilities, to select the new executive team. Only incumbent executive team members may take part in the selection of new executives.

Timeline

The executive team for the subsequent year shall be elected prior to the first half of April. The two teams will work on transitioning after final exams to handover documents and account access to the executive new team.

Qualifications

The team requires executive students to be technically competent, familiar with the team's operations, and most importantly, willing to learn. In addition, executive team members must be collaborative, diplomatic, and organized.

Technical Team

Process

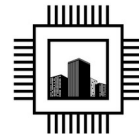
Team members shall be recruited by executive members for the coming year starting no later than the second week of September. The executive team will put out a brief questionnaire to gauge student interests and aptitudes. A name-blind screening will take place to rank candidates based on responses to the questionnaire. The executive team will then conduct interviews and hire those who are fit for the team. The executive members will determine who to hire after interviews and will not be obliged to follow the blind ranking mechanism. The name-blind ranking is only a guide for decision-making and not the deciding factor.

Timeline

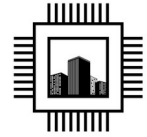
Recruiting shall begin prior to September with advertisements in the engineering newsletters and departmental newsletters. At least one information session shall be held in the first two weeks of September, but the team may choose to hold more. The team will under normal circumstances attend Imagine day and other club days to promote the team. Hiring will be done only once per year in September, but provisions can be made for a second hiring in January on a case-by-case basis.

Composition

At least 75% of the team's members shall be engineering undergraduate students. The team shall recruit members in approximately equal proportions across academic years. This is to ensure the continuity of the team and to provide opportunities for creative work between cohorts.

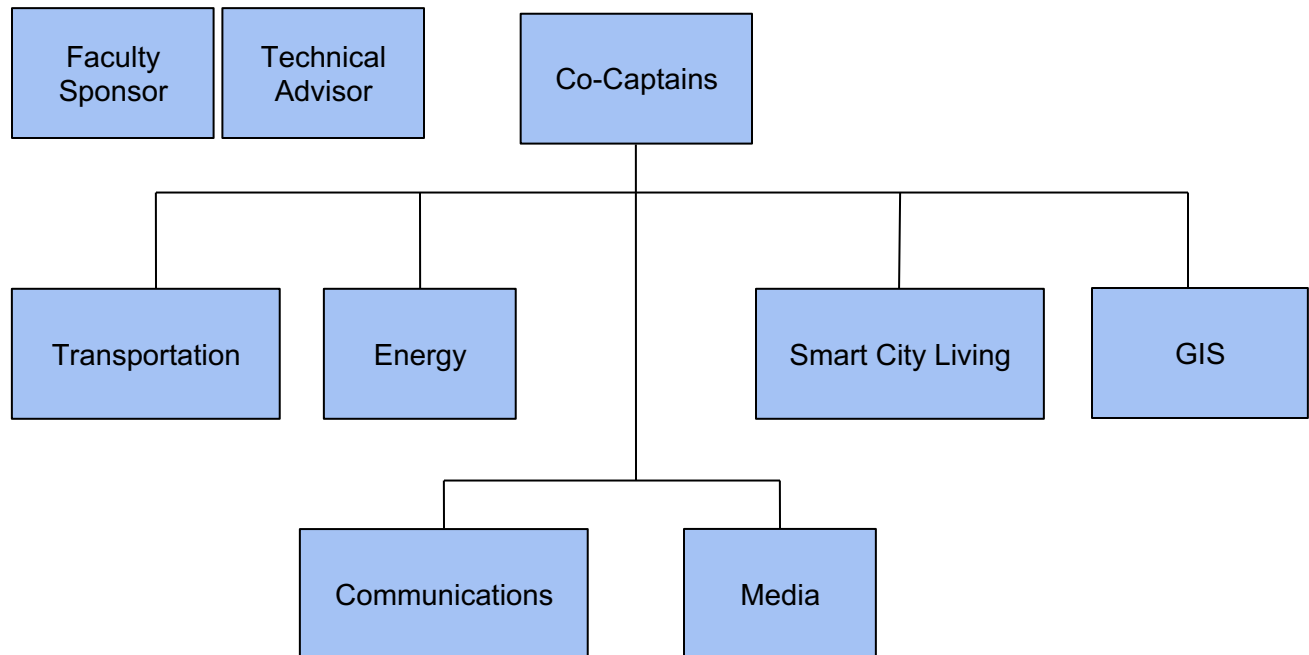
**Qualifications**

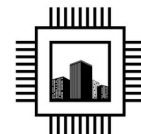
Team members are expected to be collaborative, technically competent, and willing to learn. A mix of creativity, rationality, and technical know-how are desirable in candidates.



Organizational Structure

For 24-25 academic year of UBC Smart City, the team will consist of approximately fifty student roles and up to two advisors. Four focus teams, transportation, energy, smart city living, and GIS will have a soft capped size of 15 each.





Descriptions

Role

Administration and Finance Co-Captain

The AFC is responsible for liaising with the Faculty Advisor to engage in the overall planning of the team. The AFC acts as the primary contact on behalf of the team and tracks milestones and progress for the end of year report. The AFC is responsible for the development and elaboration of the budget. The AFC coordinates with the Communications Lead to apply to funding opportunities in due time. The AFC is responsible for collecting, organizing, and processing reimbursement requests. At the end of the year, the AFC will make projections for the subsequent year and assist in writing the end of the year report to our funding sponsors. The AFC is responsible for file management, writing main reports, and setting the direction of the team.

Marketing and Operations Co-Captain

The Marketing and Operations Co-Captain is the primary point of contact for all external collaborations and internal communications, ensuring the seamless execution of the team's strategic initiatives. This role oversees day-to-day operations, including the coordination of logistics and management of internal processes, to ensure alignment with the team's goals. In addition to leading marketing efforts, the Captain is responsible for recruitment, ensuring that the team attracts and retains top talent. The Captain develops and implements strategies to enhance the team's brand presence, engage target audiences, and drive successful outcomes. By monitoring key performance indicators and refining tactics based on data, the Captain plays a critical role in achieving both marketing success and operational efficiency.

Faculty Advisor

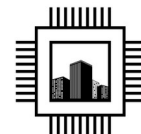
The Faculty Advisor is the primary advisor to the team, providing high level support to the Captains in goal setting, scheduling, and budgeting decisions on an as-needed basis. The Faculty Advisor assists the Captains in reviewing funding applications, and engages in dispute resolution when requested by the Captains. In the event that any team member violates UBC's Student Code of Conduct, the Faculty Advisor oversees communication with the Office of the University Council to avoid a potential conflict of interest between students during the dispute resolution process.

Technical Advisor

The Technical Advisor may be an instructor, professor, graduate student, or alumnus of the team with deep technical expertise. The Technical Advisor works closely with the Technical Lead to provide high level guidance on emerging areas of research and development. The advisor may also suggest methods for approaching problems or guide the team to observe cutting edge industry practices and implementations. The Technical Advisor is someone who can help the team to conceptually "open the black box" when attempting to dissect a system into its constituent elements, which can be engineered and reconfigured.

Safety Officer

The Safety Officer is in charge of maintaining the necessary training required to oversee the safety of the team. They ensure all members adhere to keeping their work areas safe and



clean. The team must have a designated a Safety Officer every year, and the Safety Officer must attend the walkthrough with the Captains of their reserved meeting spaces and attend the EDC safety orientation if the team has meeting rooms in that building. This role may be dually held by a member occupying another role.

Sub-team Leads

Sub-team Leads oversee the day-to-day progress of their respective teams and are responsible for meeting the weekly or bi-weekly deadlines set forth by their teams. They should be the most technically involved members of the team and be broadly interested in all aspects of the project delivery. Sub-team Leads are essential for making sure the team meets their micro-milestones, which are the building blocks for the term long projects set forth. Students in this role can expect to learn deeply about project definition, data collection and analysis, and domain knowledge in their respective projects. This role is excellent for those who wish to gain deep technical skills for employment in cutting edge engineering firms.

Communications Lead

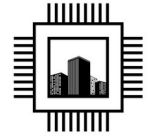
The Communications Lead is responsible for liaising between the Sub-teams and managing external communications. As there may be tasks within Sub-teams requiring assistance of other Sub-teams, the Communications Lead is responsible for handling information and bridging collaboration across the Sub-teams. The Communications Lead is responsible for staying updated on the progress of each Sub-team and ensuring the right information reaches the right people at the right time. The Communications Lead will also coordinate external communications such as sponsorship, competitions, and presentations.

Media Lead

The Media Lead is responsible for maintaining the team's branding guidelines and sending out communications in accordance with those guidelines. The Media Lead will build and maintain the team's website as well as all social media pages. The design of team t-shirts, promotional stickers, and banner will be coordinated by the Media Lead. The member will write promotional content for the team and distribute it to relevant newsletters such as the EUS e-nEUS and department specific newsletters. The Media Lead role is most demanding in the beginning and end of the academic year but maintains a relaxed pace throughout the year. Preference will be given to those who are available to work on promotional material in mid-July to be sent out in September.

Technical Members

Technical members will contribute their time to working on their term projects. Roles within a team are fluid, but everyone is expected to contribute equally. General members will find themselves contributing to the attainment of weekly goals. This is an exciting position to get hands-on experience with projects that go above and beyond the classroom experience. Students in this role can expect to pick up both epistemic as well as technical knowledge relating to their sub-team topics. Technical members who thrive in their roles will represent the team at competitions and have the team's backing to help them finish in first place.



Activity

Projects

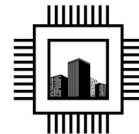
Throughout the year, team members will work with their team leaders to define, design, and deliver projects of their choosing. Due to the range of issues cities face and technical depth required to build something meaningful, the project definition phase is up to each sub-team to ensure they have a topic that their members are interested in and capable of tackling. The results of each sub-team's projects will be published to GitHub or turned into a report/presentation and put on our website. Data and research collected in prior years may be used and developed upon in following years.

Competitions

Team members that demonstrate excellent technical and collaborative ability will be offered to represent the team at competitions. The concept and feasibility of Smart Cities are relatively new, and so the industry lacks a single, unifying competition. In lieu of this, the team aims to curate a selection of local and international competitions to send our team members to. Example past competitions include:

- City of Vancouver Decongest Hackathon
- City of Vancouver VANquish Collisions Hackathon
- Rogers Smart City Challenge
- IEEE Smart Cities Hackathon
- American Planning Association Student Design Competition

70% Projects – 30% Competitions

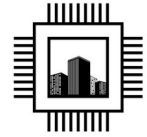


End of Year Reporting

The Captains and Technical Leads will compile an annual progress report for the team as a whole. The report will include milestones achieved, highlights of the technical teams, and goals for the subsequent year. This is to demonstrate to the community and our sponsors the team's commitment to fulfilling its vision. The end of year progress reports will be made available on our website to build long term rapport to partners and highlight our rising stars.

Budget

At the end of the year the team will report its budget demonstrating all sources of income and expenses. The team will strive each year to attract industry partners to assist with funding the project and will give sponsors recognition in the team's visual guidelines. Logos of sponsors will be featured in our promotional material according to the tier of sponsorship they provide.



Appendix

A – What are smart cities?

Smart cities and towns utilize data gathered from sensors to be analyzed and interpreted to optimize, automate, and better respond to the needs and goals of the citizens. In other words, smart cities use the abundance of data and digital infrastructure to efficiently allocate resources and services. Although this definition may sound specific, it entails a large umbrella of applications ranging anywhere from mapping available parking spaces, home weather stations, interpolating geology for mining, and incorporating personalized education.

For example, imagine a normal city, where garbage collection trucks use a fixed route and schedule. The roaring truck often stops for bins that are nearly empty if too early or overflowing if too late. The truck stops more frequently and is on the road for longer than necessary, contributing to carbon emissions, traffic congestion, and unsightly sidewalks.

Now, imagine a smart city. The bins are equipped with sensors that tell the city when the bin is nearing capacity. Optimized routes are generated that include only the bins in need of being emptied. An autonomous electric truck is then deployed to quietly collect the garbage at the right time. Once the garbage collection is complete, the truck parks itself and recharges from the energy grid at hours when the city's electricity demand is low, resulting in cheaper prices.

In the above example, smart city components (smart bins, smart vehicles, and peak-load energy pricing) are used to contribute to key smart city goals (reducing emissions, congestion, and noise, keeping sidewalks clean, and balancing daily energy demand). Most smart city methods include data collection, communication, and automation, while common goals are more sustainable cities and an improved quality of life.

Ultimately, smart cities can apply existing and developing technologies in innovative ways to increase prosperity and improve citizens' quality of life. When you join our team, you will have the opportunity to discover, define, design, and execute projects that aim to build a smarter city. Cities worldwide are facing broad challenges, so the emerging field of smart cities is ripe for innovation and disruption.