

CCSU  
DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, December 8

3:15 – 4:15 PM

Maria Sanford, Room 101

**LEAST SQUARE ADJUSTMENT METHOD IN  
SURVEYING AND GEOSCIENCE**

**JANI LAME**

**CENTRAL CONNECTICUT STATE UNIVERSITY**

**Abstract:** The least squares method is a fundamental mathematical technique employed in land surveying to refine and analyze survey measurements. By formulating a mathematical model and adjusting parameters, a method is created that aims to estimate the most probable values while considering errors. In geodetic surveying, where precision is crucial, the least squares method enhances accuracy by minimizing measurement errors.

In the first part of the talk, we explain the model and we deduce the basic formulas. We continue by providing examples. The second part of the talk explains an exploration of Micro Survey STAR\*NET-PRO, a cutting-edge software solution reshaping the landscape of geodetic network adjustments. Attendees gain a comprehensive understanding of how this powerful tool efficiently processes observational data, refines coordinates, and ensures unparalleled accuracy in geodetic measurements. Real-world applications highlight the software's role in streamlining survey workflows and elevating overall precision. Then we will discuss GPS surveying. The use of GPS technology for precise location determination involves measuring distances to satellites, employing geometry, calculus, and statistics. Correcting errors caused by atmospheric refraction and satellite clock errors involves mathematical algorithms, such as differential GPS (DGPS). GPS data, vital for creating maps and GIS integration, finds applications in urban planning, environmental monitoring, and disaster response.

By the session's conclusion, participants will have acquired a nuanced understanding of the critical interplay between mathematics, the LSA method, GPS technology, and the advanced capabilities of Micro Survey STAR\*NET-PRO. Empowered with this knowledge, attendees will be well-equipped to attain new levels of accuracy in their geodetic endeavors.

**To join us online use the following link:** <https://ccsu.webex.com/meet/gotchev>

For further information: [gotchevi@ccsu.edu](mailto:gotchevi@ccsu.edu); 860-832-2839; <http://mathcolloquium.sites.ccsu.edu/>