



2022 IEEE/AIAA ITEC+EATS BATTERY STATE OF CHARGE ESTIMATION STUDENT CHALLENGE

CALL FOR PROPOSALS

Introduction

The IEEE/AIAA Transportation Electrification Conference and Electric Aircraft Technologies Symposium (ITEC+EATS) invites you to participate in the 2022 ITEC+EATS Battery State of Charge Estimation Student Challenge. To tackle the climate change crisis, ambitious emission reduction goals have been established which require radical technologies and revolutionary solutions to realize. In the transportation sector, one way to achieve these goals resides in the increased electrification of vehicles. To electrify the vehicles, advanced battery systems have been identified as a promising solution. Most of the battery states, e.g., state of charge (SOC), state of health, state of power and internal temperature, cannot be measured directly by any types of sensors; instead, they can only be estimated by models. Moreover, these states are highly affected by the load dynamics and environments, which brings more difficulty for accurate estimation. Therefore, the design of state estimation models for vehicles needs a careful examination. Such skills are now essential to engineers and researchers who will design the electrical vehicles of the future.

Challenge: The competitors will be challenged to create the best performing electric vehicle battery state of charge estimation algorithm. To develop the algorithm, teams will be provided with a high-quality dataset consisting of Li-ion battery characterization and drive cycle test data over a wide range of temperatures. Throughout the competition, teams can submit their algorithms in Matlab script format via an electronic portal. The algorithms will be tested automatically using a set of data which the competitors are blind to, and the error for each test case will be reported back. This *blinded* SOC estimation development approach allows for a fair comparison of the submitted algorithms. The winner of the competition will be selected primarily based on quantitative performance metrics. Algorithms do not need to be new or unique. Teams are encouraged to use algorithms from their current or prior research and from the literature, as much of the effort is in the algorithm implementation and tuning / training.

Schedule:

- Submission Opens: February 2022
- Teams submit a Letter of Intent to participate:
No later than March 31, 2022
- Teams submit requests for information / clarification: Continuously, but no later than April 30, 2022
- Teams submit final SOC estimators and summary report no later than June 1, 2022
- Winning teams announced at ITEC/EATS 2022, June 15-17, 2022

Eligibility:

Each student can only be on one team. Conference registration is **not needed** to participate.

Teams can consist of the following:

- Undergraduate students
- Graduate students
- Combined undergrad and graduate students

Prize – Sponsored by MathWorks:

- 1st Place: \$750
- 2nd Place: \$500
- 3rd Place: \$250

Each winning team will also receive one free registration if they would like to attend the conference

Contact All information including any updates will be posted on the Competition info page:

<https://macdrive.mcmaster.ca/f/38b48eee5cbb49b8991b/>

All questions related to this RFP should be addressed to: Phillip Kollmeyer kollmeyp@mcmaster.ca and Xiaolei Bian xiaoleib@kth.se