

POMONA COLLEGE
COMPUTER SCIENCE COLLOQUIUM

Scheduling Observations for an Airborne
Telescope: Theory and Practice

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Abstract: We consider the problem of scheduling observations for the Stratospheric Observatory for Infrared Astronomy (SOFIA), a 2.5m diameter telescope designed for infrared astronomy. The problem is conceptually divided into increasing timescales, from scheduling a single day's worth of observations to an entire year's worth. The problem requires selecting observations to schedule from proposals in order to maximize expected scientific return; sequencing observations in order to maximize efficiency; and satisfying numerous physical constraints and scientific preferences. We explore a number of different scheduling algorithms to address this problem, making extensive use of contemporary scheduling algorithms employed for other problems and using classical results from mathematics and theoretical computer science. We report on the progressive improvements in our algorithms, the refinements to the problem we were asked to solve, and comparisons of the results of our algorithm to human experts on a one-year horizon scheduling problem.

Jeremy Frank is an employee of NASA at NASA Ames Research Center. He works in Code TI in the Autonomous Systems and Robotics area and is Group Lead of the Planning and Scheduling Group. He has a BA in Mathematics from Pomona College and a MS and PhD in Computer Science from U.C. Davis. His academic interests include Artificial Intelligence, particularly planning, scheduling and combinatorial optimization and search.

4:15 on Thursday, April 10th

Rose Hills Theater—Smith Campus Center

Pomona College

Refreshments available at 4:00