

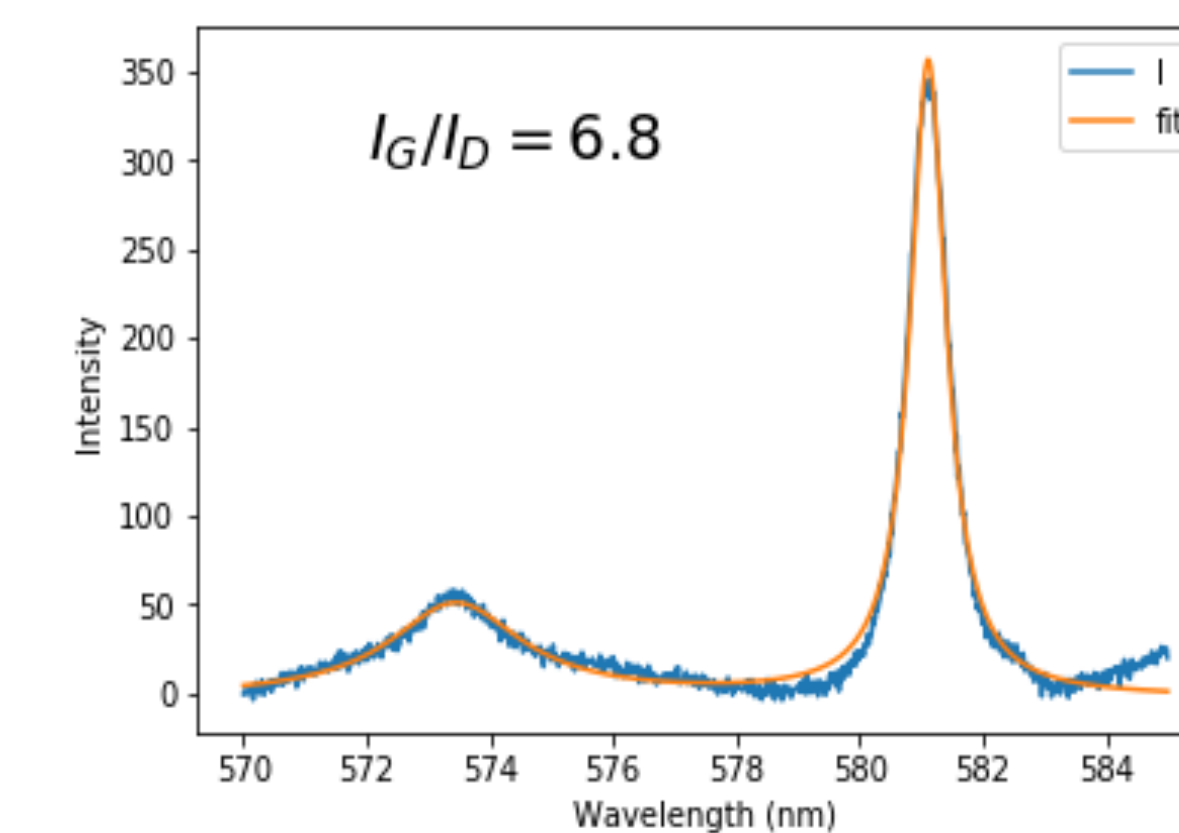
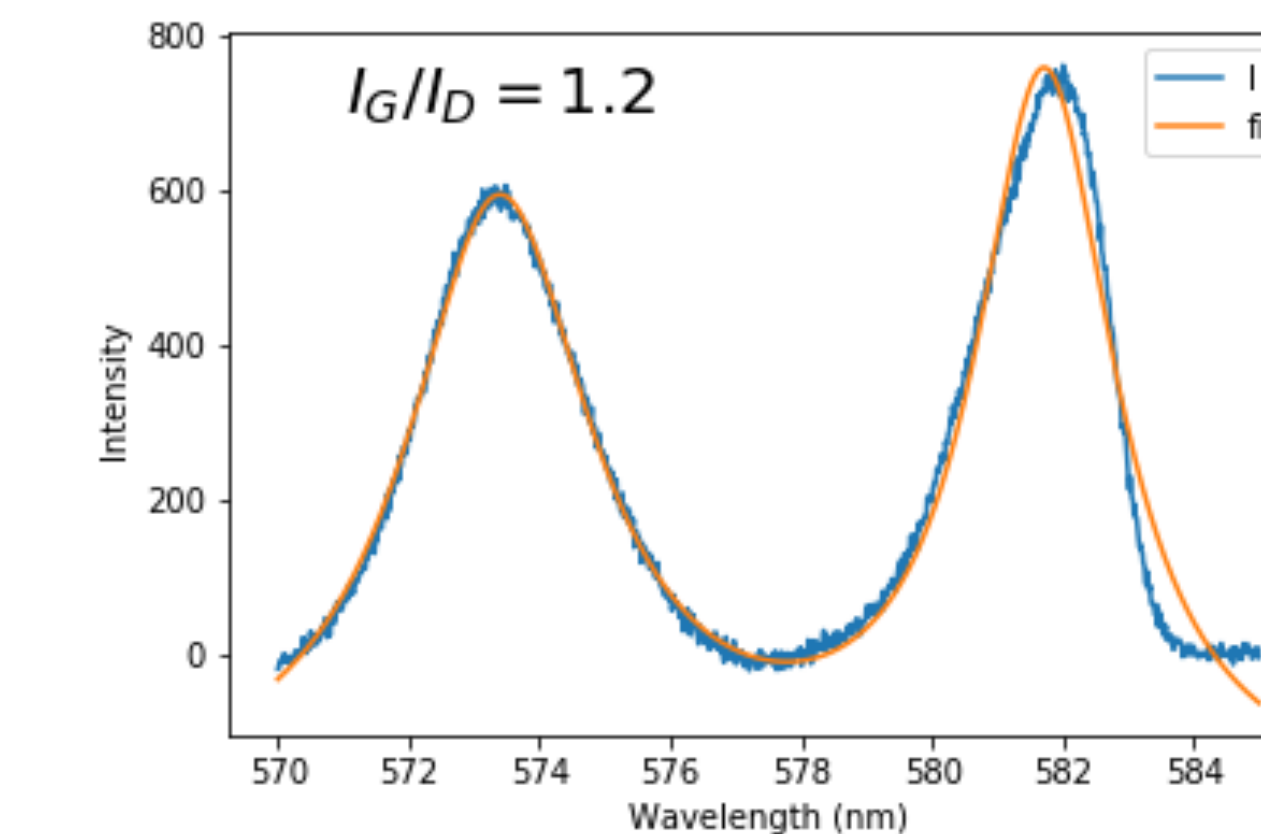
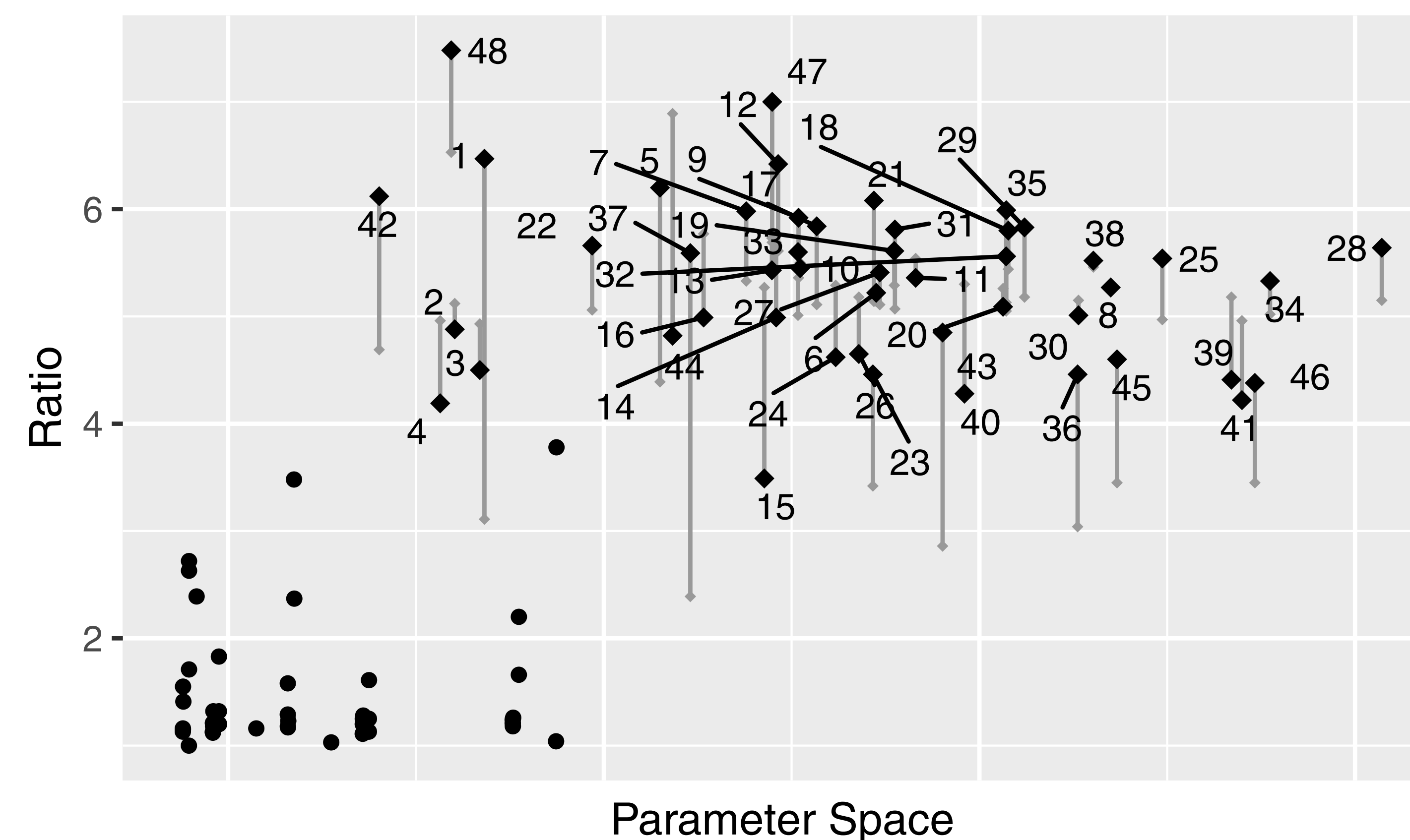
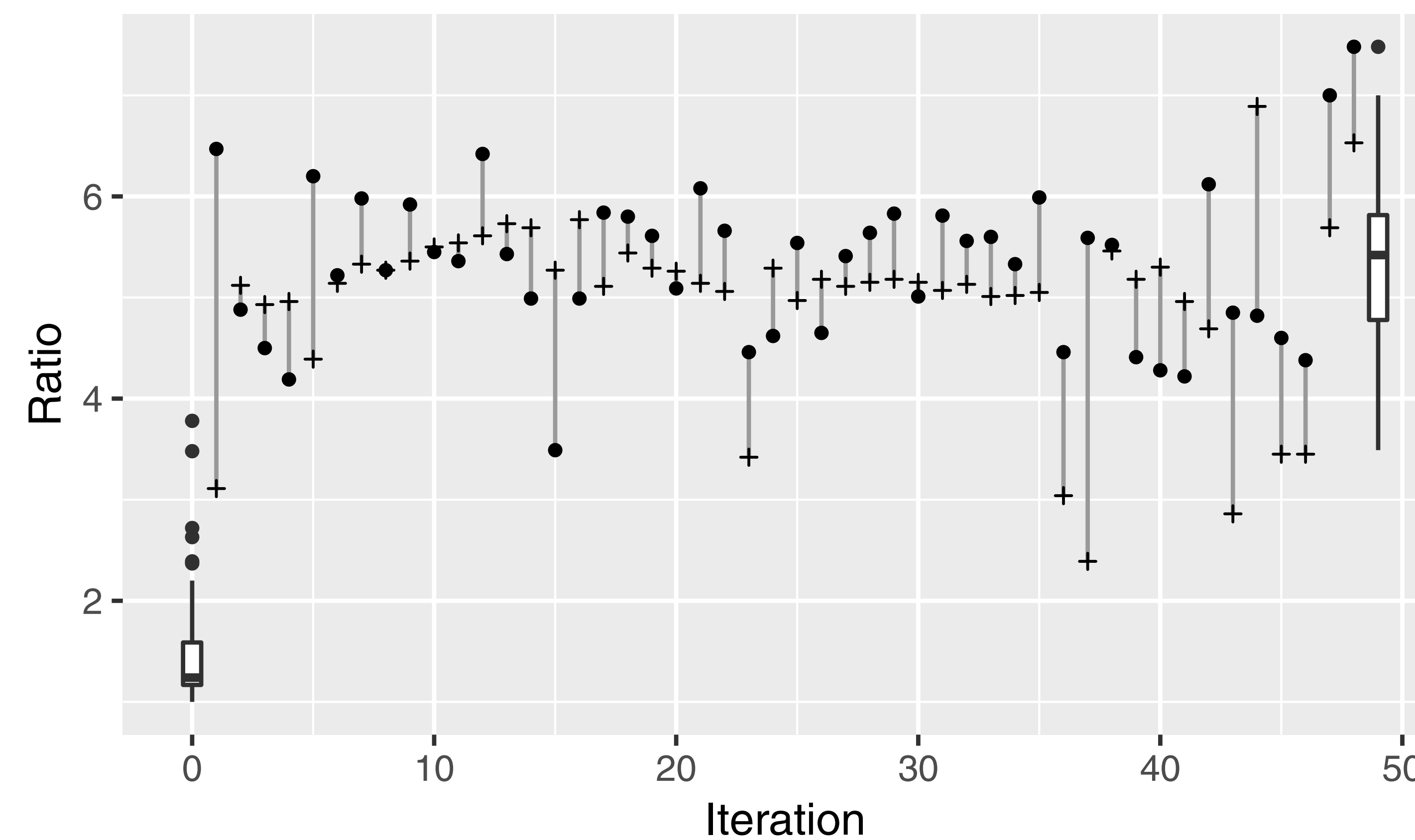
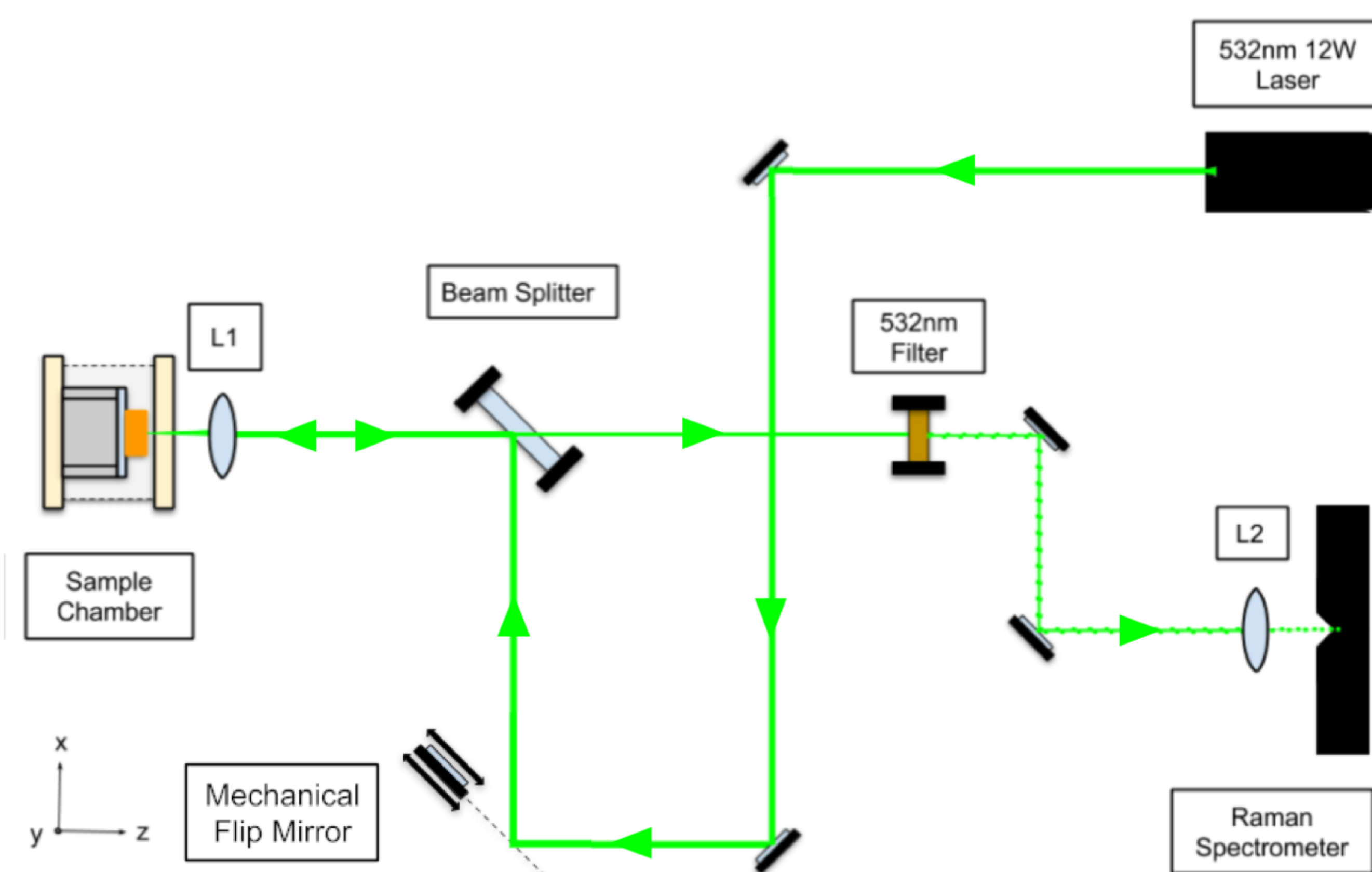
# AI for Materials Science: Tuning Laser-Induced Graphene Production

Lars Kotthoff, Vivek Jain, Alexander Tyrrell, Hud Wahab, Patrick Johnson

Center for Artificially Intelligent Manufacturing (AIM)

University of Wyoming

- transform graphene oxide into graphene through laser irradiation
- tune laser parameters (power, duration, pressure)
- assess quality of conversion by ratio of G and D peaks in Raman spectrum
- use Bayesian optimization to maximize G to D ratio



- improvement of factor of two over best result in literature
- explores part of the parameter space ignored by experts
- MBO code can be used by domain scientists with no background in AI/ML

Bischl, Bernd, Jakob Richter, Jakob Bossek, Daniel Horn, Janek Thomas, and Michel Lang. "Mlrmbo: A Modular Framework for Model-Based Optimization of Expensive Black-Box Functions," March 9, 2017.

<http://arxiv.org/abs/1703.03373>.



Full paper at [https://www.cs.uwyo.edu/~larsko/papers/kotthoff\\_ai\\_2019.pdf](https://www.cs.uwyo.edu/~larsko/papers/kotthoff_ai_2019.pdf)

