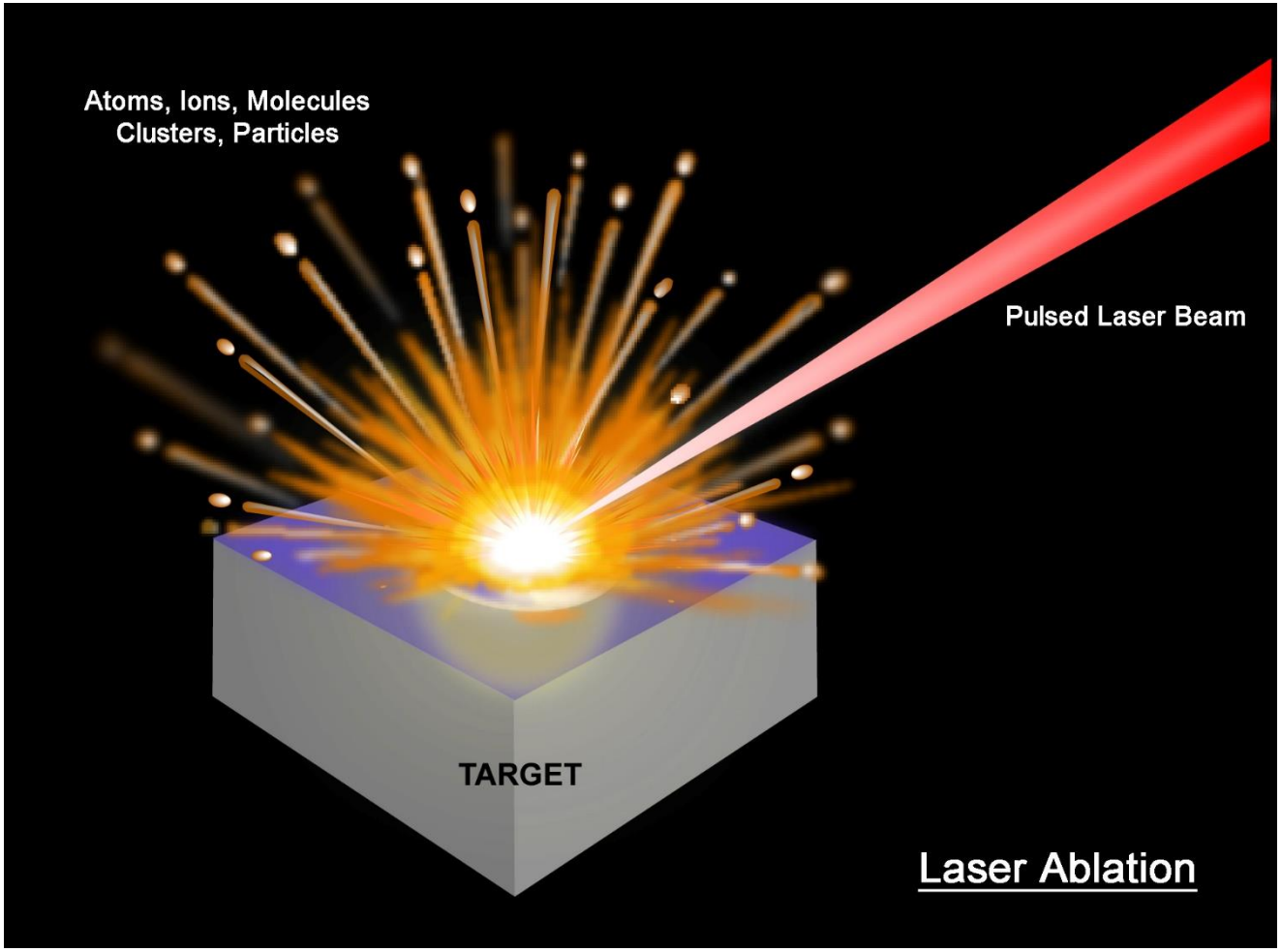
OUR GOAL

Using high-power pulsed lasers to interrogate biological and biomedical materials. The ultimate goal of most of my work is to provide real-time quantitative diagnostic information to health care practitioners.



OUR TOOL

When you analyze the light in this event it is called "***laser-induced breakdown spectroscopy***"

Zapping Mars

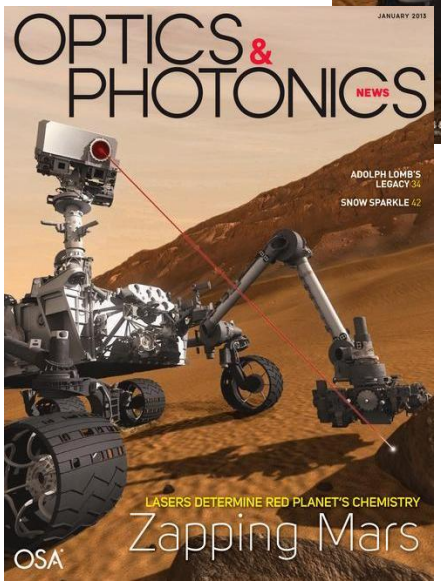
Using Lasers to Determine the Chemistry of the Red Planet

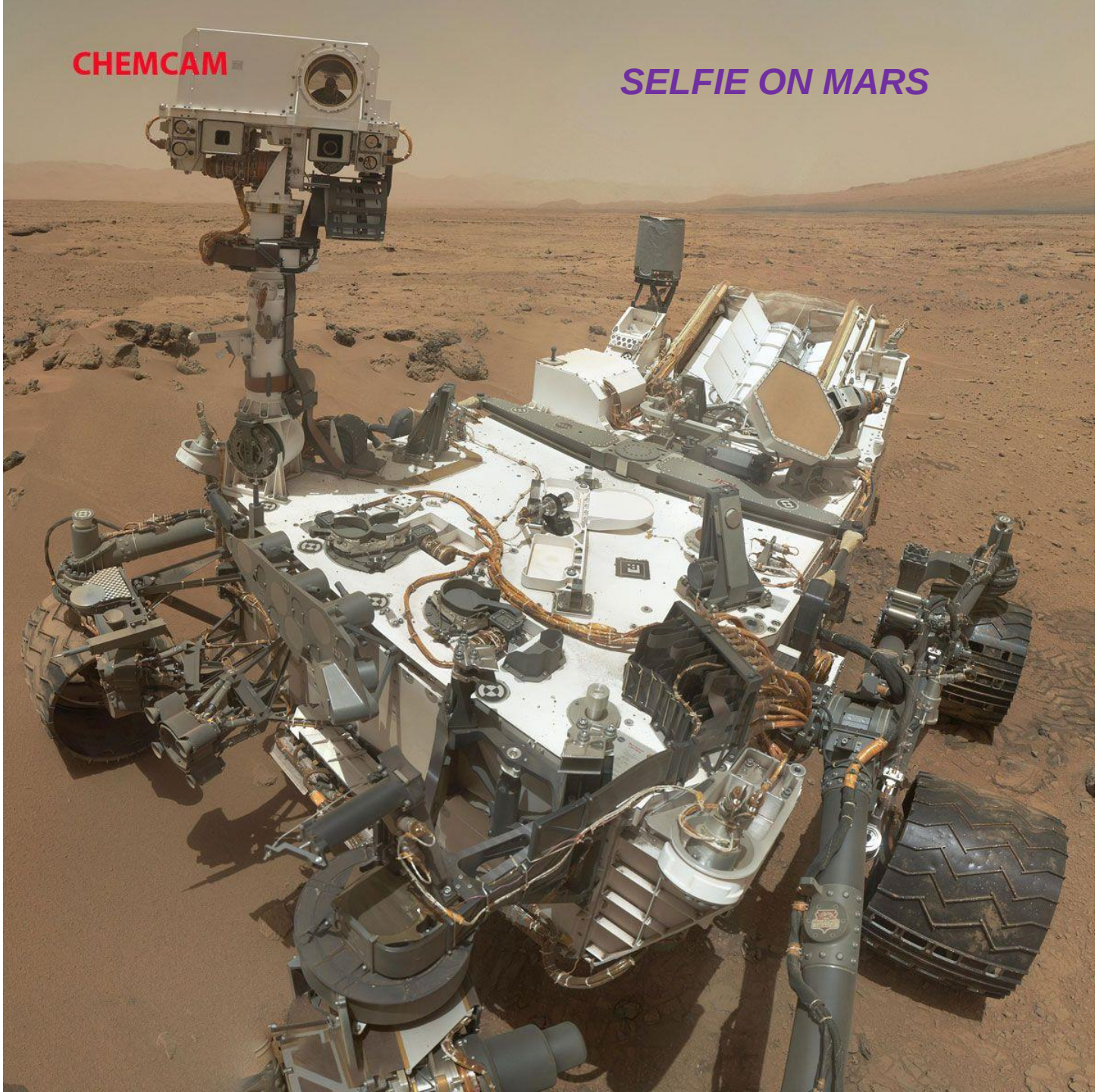
Noureddine Melikechi, Roger Wiens,
Horton Newsom and Sylvestre Maurice

The space rover *Curiosity* is using laser-induced breakdown spectroscopy to characterize the surface of Mars.

An artist's conception of the ChemCam instrument aboard the *Curiosity* rover in operation. The ChemCam can be used to determine the chemical composition of the various sedimentary layers of the plant.

NASA/JPL-Caltech




CHEMCAM
SELFIE ON MARS

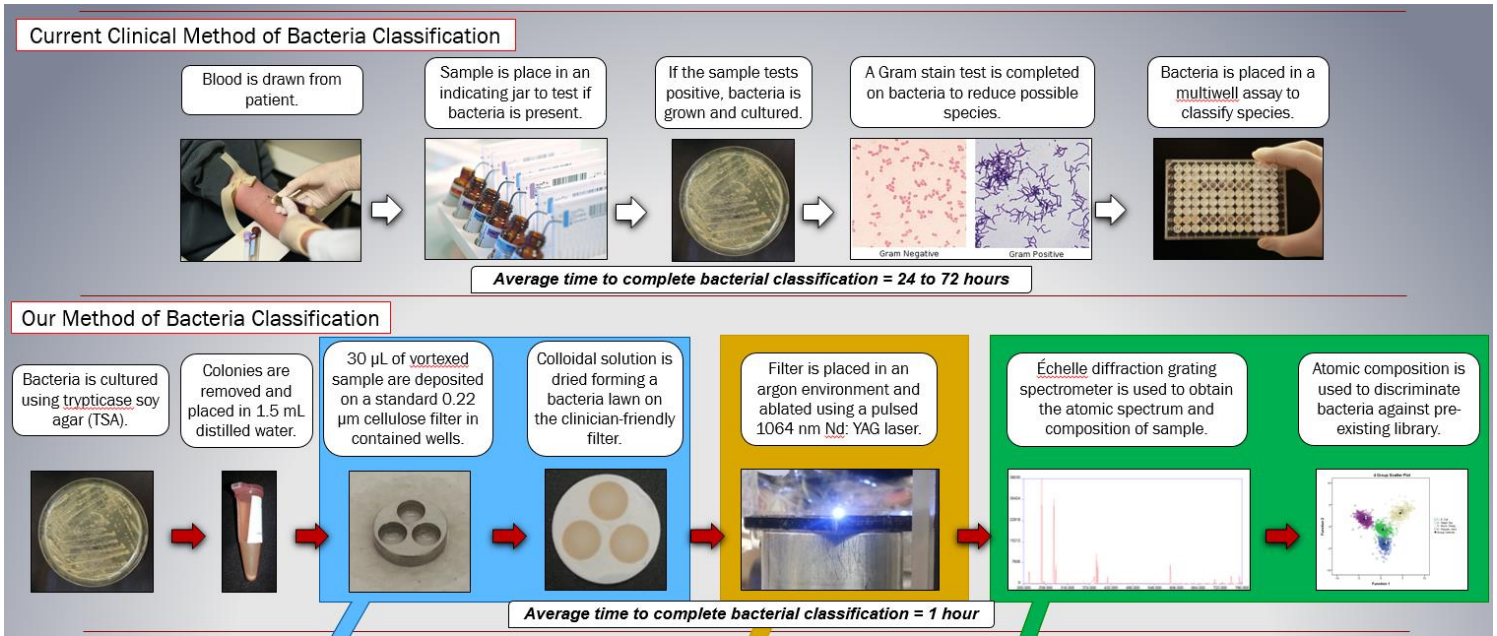
OUR TEAM – OUR PROJECTS

Rapid identification of bacteria using laser-induced breakdown spectroscopy

Master's student Alexandra Paulick

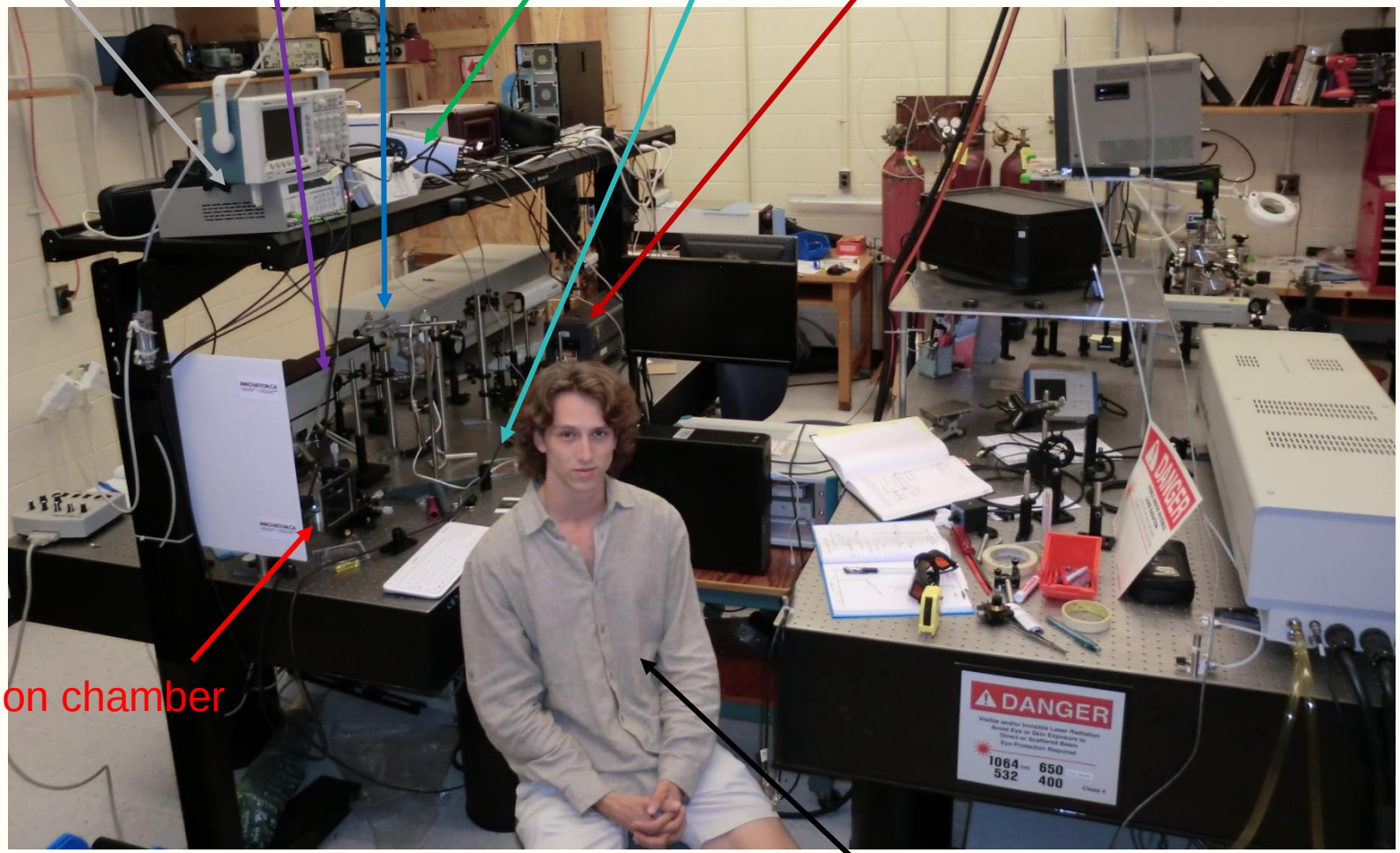
Dylan Malenfant, M.Sc. Physics

Outstanding Scholars student Derek Gillies, B.Sc. Honours Physics (Medical Physics)



OUR TEAM – OUR PROJECTS

Investigation of RELIBS in atmospheric pressure lanthanide plasmas



Thesis student Beau Greaves, B.Sc. Honours Physics (Medical Physics)

OUR TEAM – OUR PROJECTS

Outstanding Scholars Student Paul Dubovan, Outstanding Scholars Student and NSERC USRA Christopher Heath

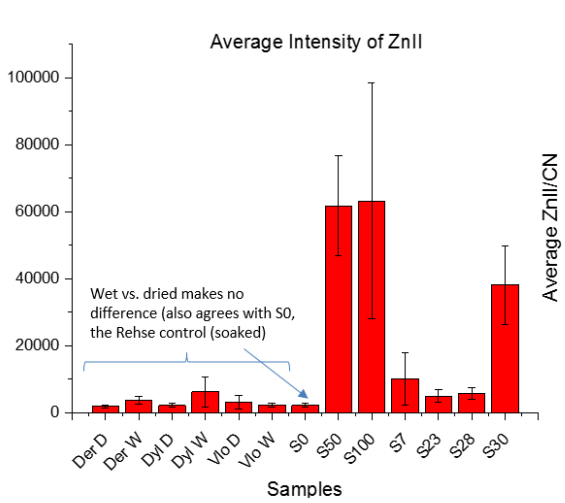
Computerized analysis of spectrometer data

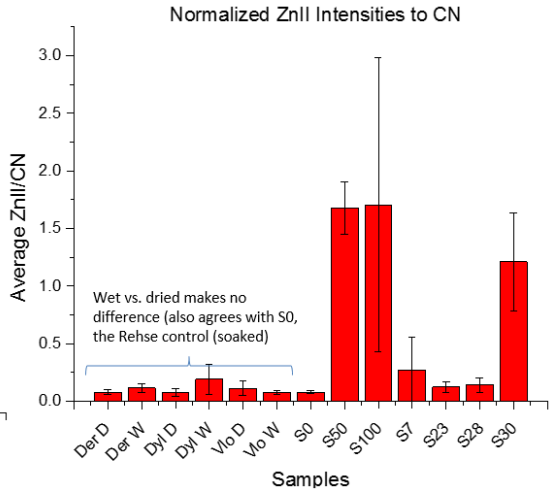
Laser characterization of fish otoliths and computerized analysis of spectrometer data

Assay of zinc in human fingernails via LIBS

Outstanding Scholars Student Vlora Ribery, B.Sc. Honours Physics (Medical Physics)

Low Zn=S7, S28
High Zn= S23, S30



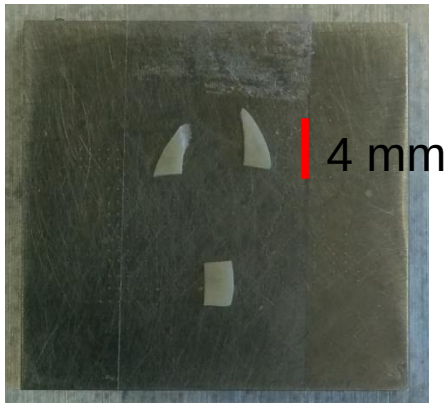


Weighted average of three dry samples:
1933.98 ± 345.258

Weighted average of four wet samples:
2406.5 ± 353.46

Weighted average of three dry samples:
0.0834 ± 0.0167

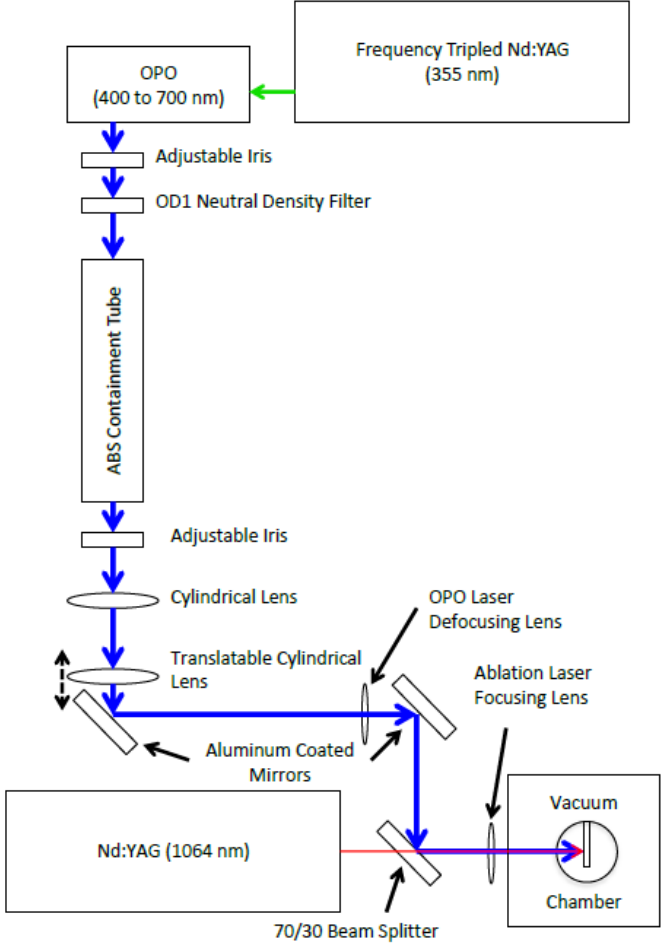
Weighted average of four wet samples:
0.0826 ± 0.00939

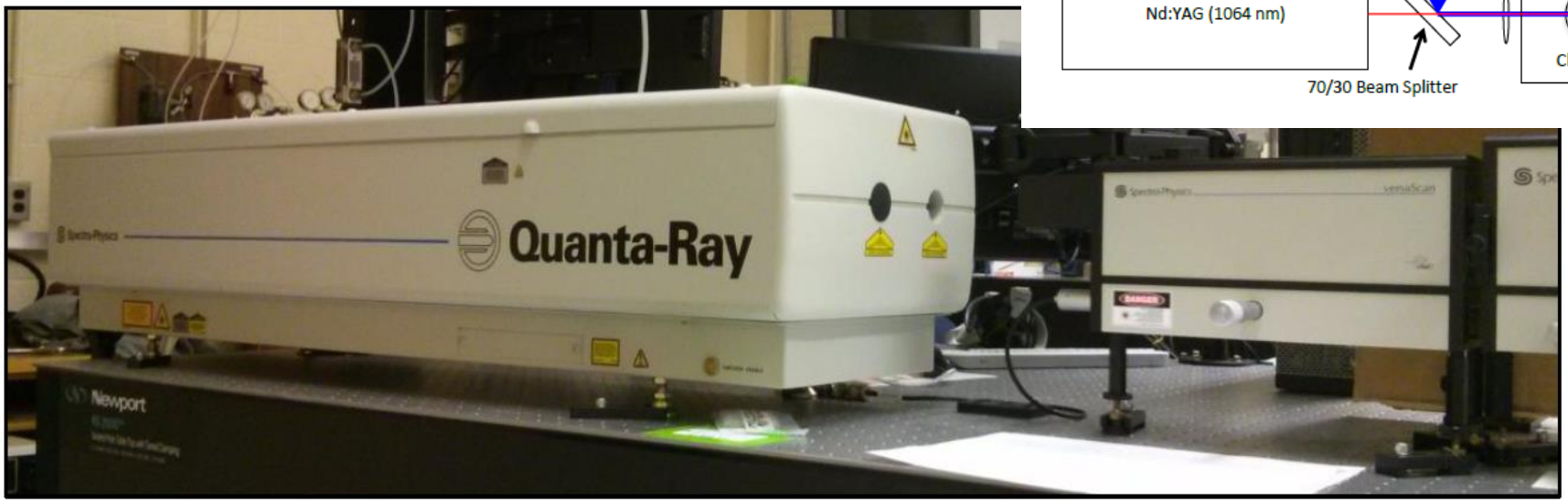


OUR TEAM – OUR PROJECTS

Construction of an OPO laser-induced fluorescence system

Outstanding Scholars student Anthony Piazza, B.Sc. Honours Physics (Medical Physics)





OUR TEAM – OUR PROJECTS

- Building a whole new LIBS system using a new spectrometer
- Determining the gas stoichiometry in iron furnaces

- Nanoparticle or microparticle enhanced LIBS
- Using LIBS to determine greenhouse produce health/nutrition