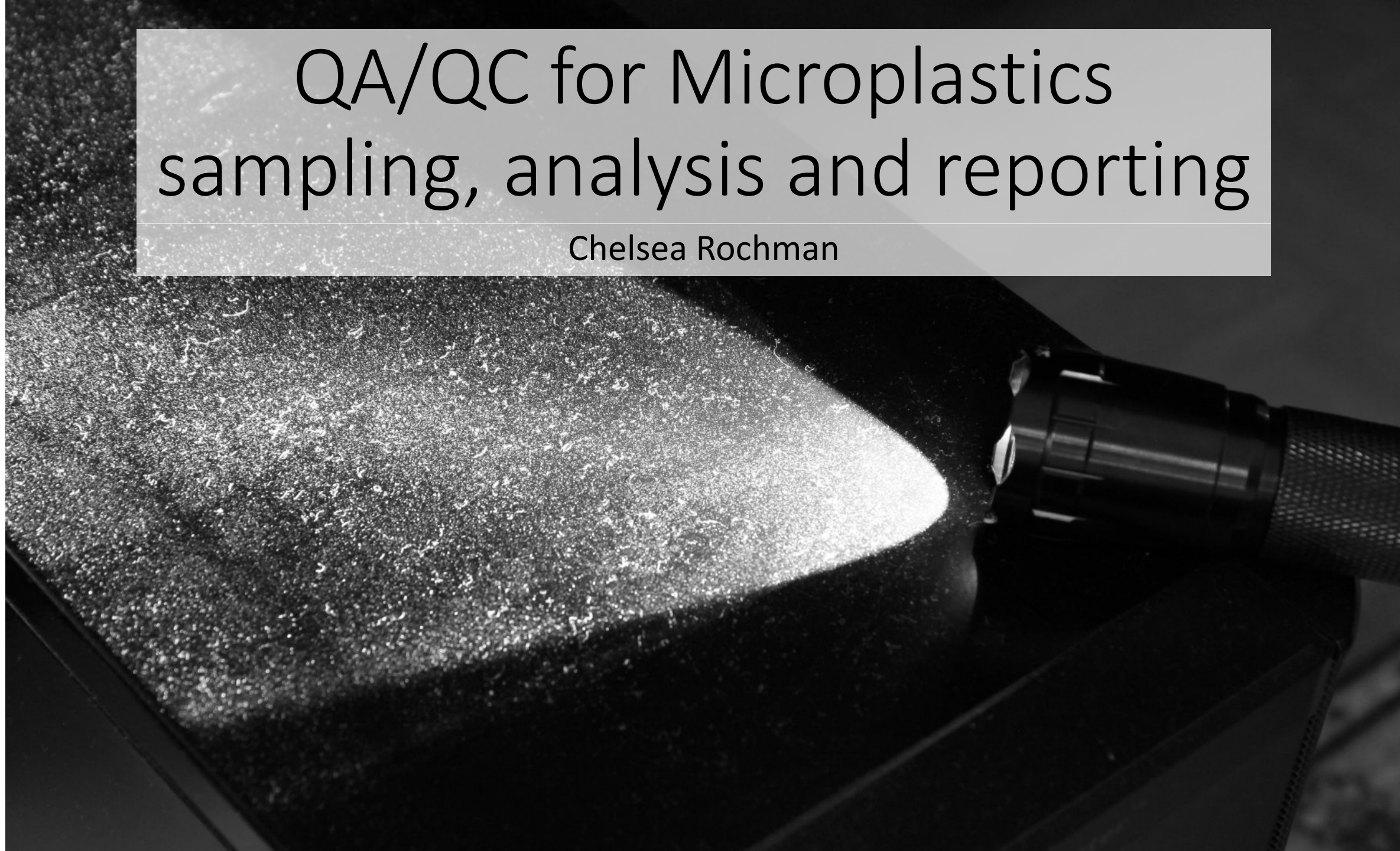
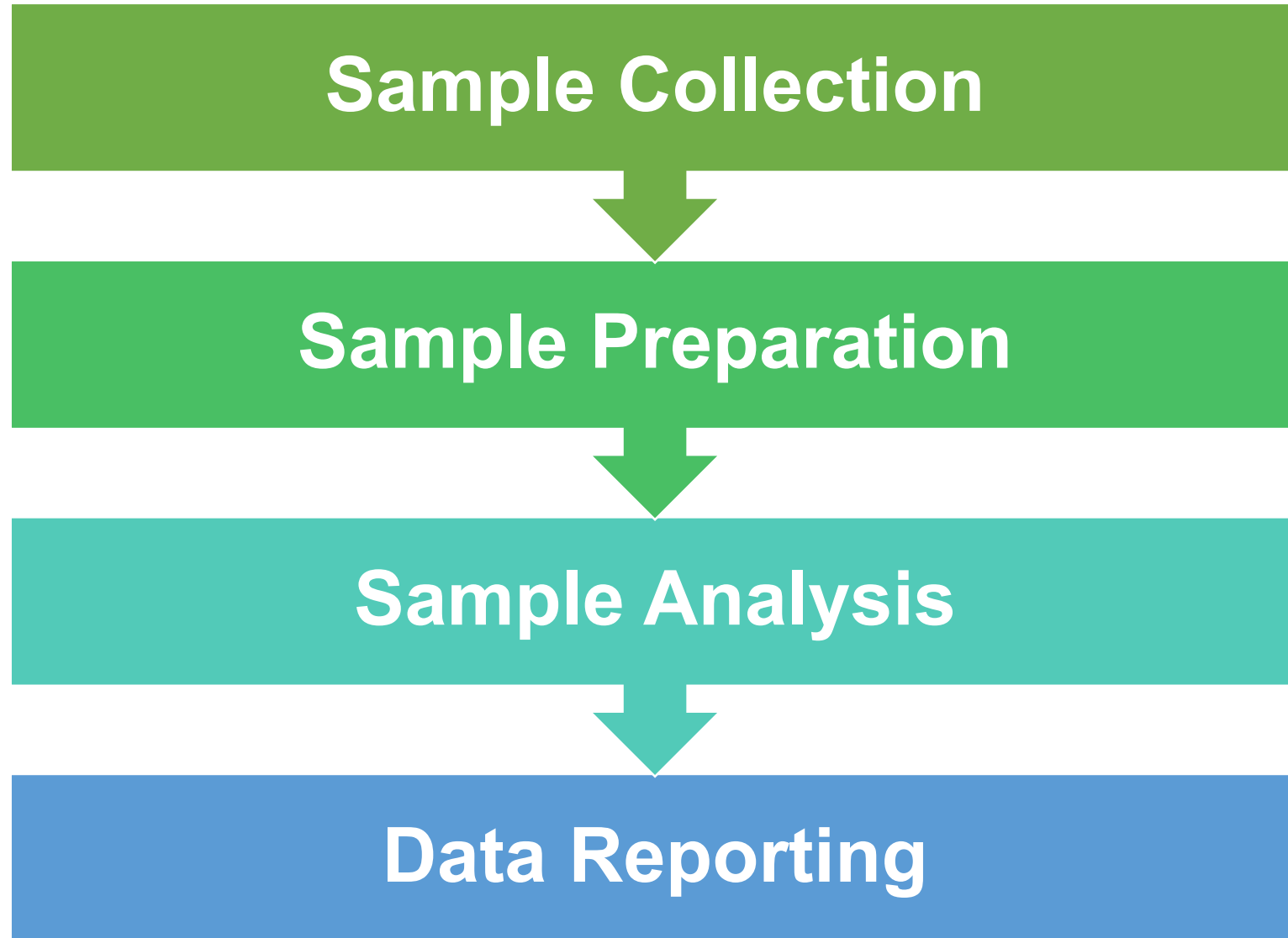


QA/QC for Microplastics sampling, analysis and reporting

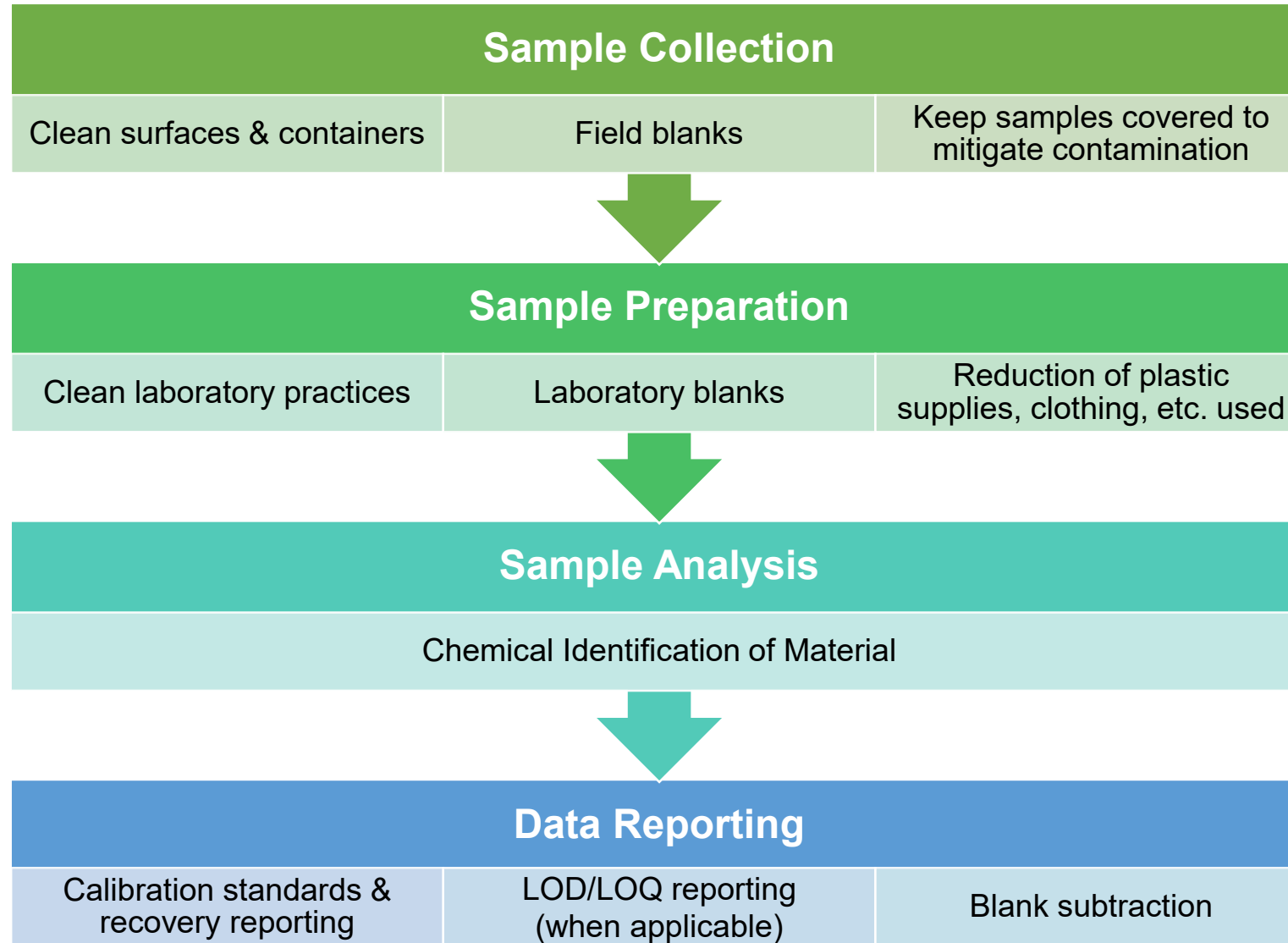
Chelsea Rochman



What can we learn from the field of analytical chemistry?



What can we learn from the field of analytical chemistry?



Best Practices /Sound QA/QC

- Clean Techniques
- Training protocols
- Blanks & Blank Subtraction
 - Spike recoveries
- Chemical analysis of particles
- Transparent and harmonized reporting

Clean Techniques

- Avoid Dust by –
 - Wiping benchtop regularly and mopping
 - Work in a clean cabinet
 - Get a HEPA filter
 - Cover samples whenever possible
- Avoid procedural contamination with –
 - Cotton lab coats
 - Brightly colored jumpsuits 😊
 - Clean tools in water between use
 - Use glass or non-plastic materials where possible

Be aware of and catalogue the type of contamination you might see in your samples – filter pieces, fibers from lab coats, hair, kim wipe fibers, rope from the boat or net, etc ...

Training protocols to standardize your lab

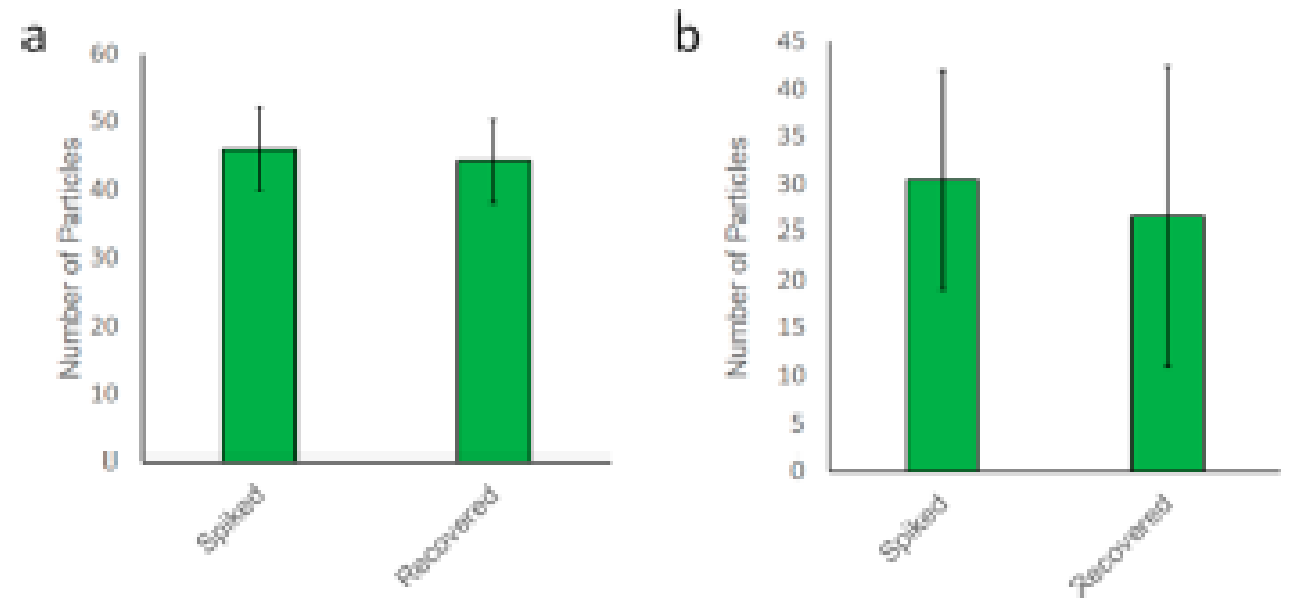
- Have a lab training protocol. For example:
 - Small sample volume on petri dish at a time
 - Use both white and black background
 - Use touch and feel in addition to visual
- Consider people bias – something to think about, consider, account for (better to have one person on a study if possible; two people count for some samples)



Test the recovery of the method in your laboratory

- Similar to a matrix spike in analytical chemistry
- To test efficacy of methods.
- Do this by number of particles
- Use different polymers types, shapes, sizes...

Environmental Science & Technology Letters



Grbic et al., 2019 *ES&T Letters*

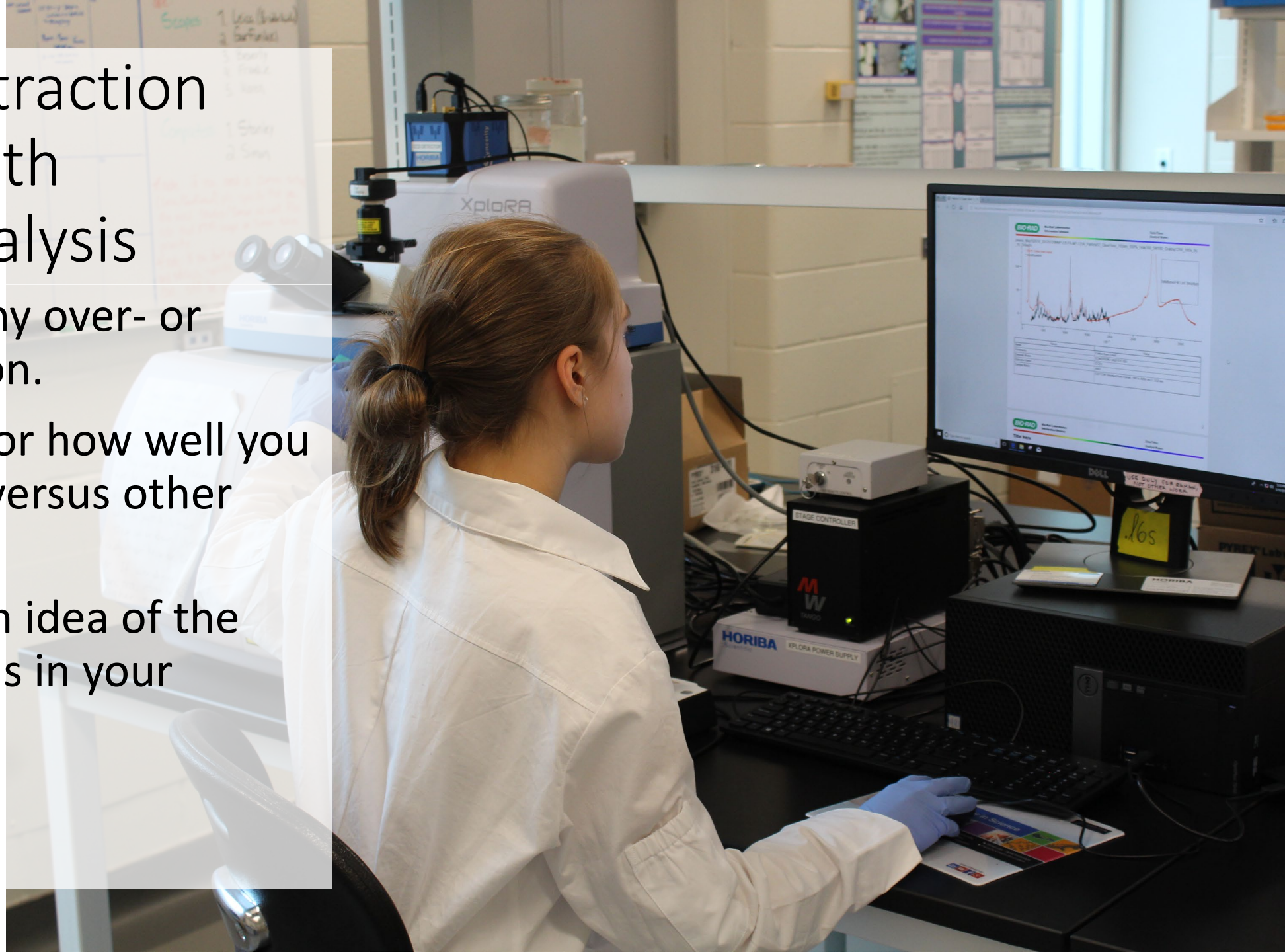
Include field and laboratory blanks

- To account for procedural contamination
- Make sure you sample enough volume to be 3x above the amount in your blank.
- Should mimic how you sample and process the sample
- Blank subtraction -
 - By color and category



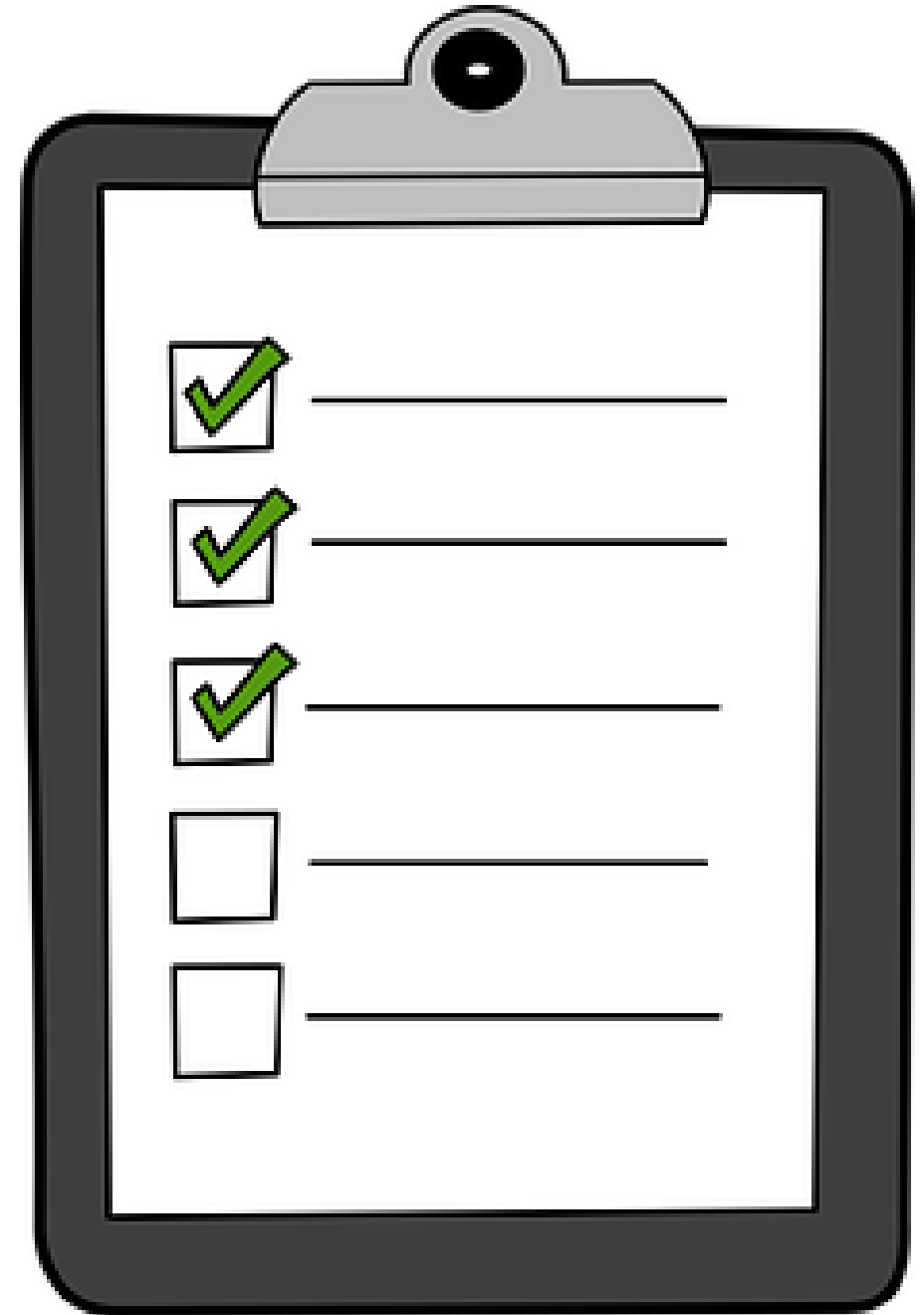
Test your extraction efficiency with chemical analysis

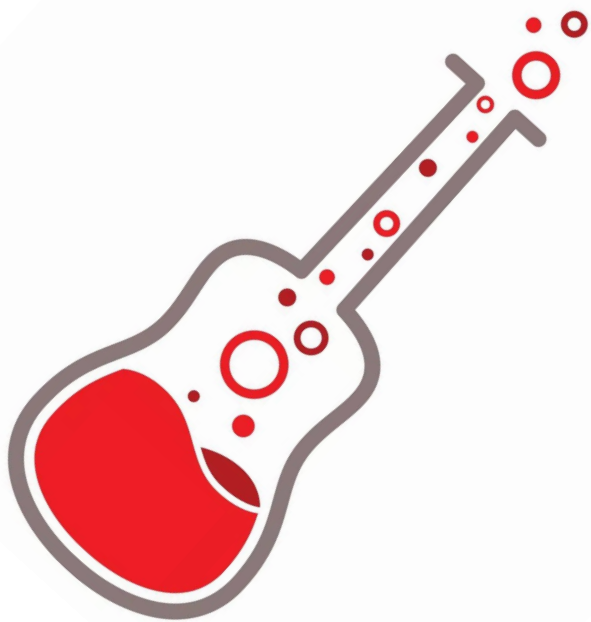
- Helps control any over- or under-estimation.
- Is a descriptor for how well you picked plastics versus other materials.
- Also provides an idea of the type of materials in your sample.



Best practices for reporting

- Include a section for QA/QC
 - Describe clean techniques
 - Blanks and subtraction
 - Recovery of method used, correct?
 - Report your LOD/LOQ
 - Provide subsampling strategy for chemical ID
- When you show your raw data, report:
 - Particle size (or size range)
 - Colour
 - Morphology (i.e., shape category)
 - Material type (based on subsampling strategy)
- Give plastic concentrations in # of particles per unit volume (or organism)
- Share ALL your data for synthesis studies.





Thank you!