

# **Week 7 Demo**

## **(Precipitation)**

Harrison Chapter 10  
Brock Chapter 9

Tim Chui

# Learning Goals (from Monday)

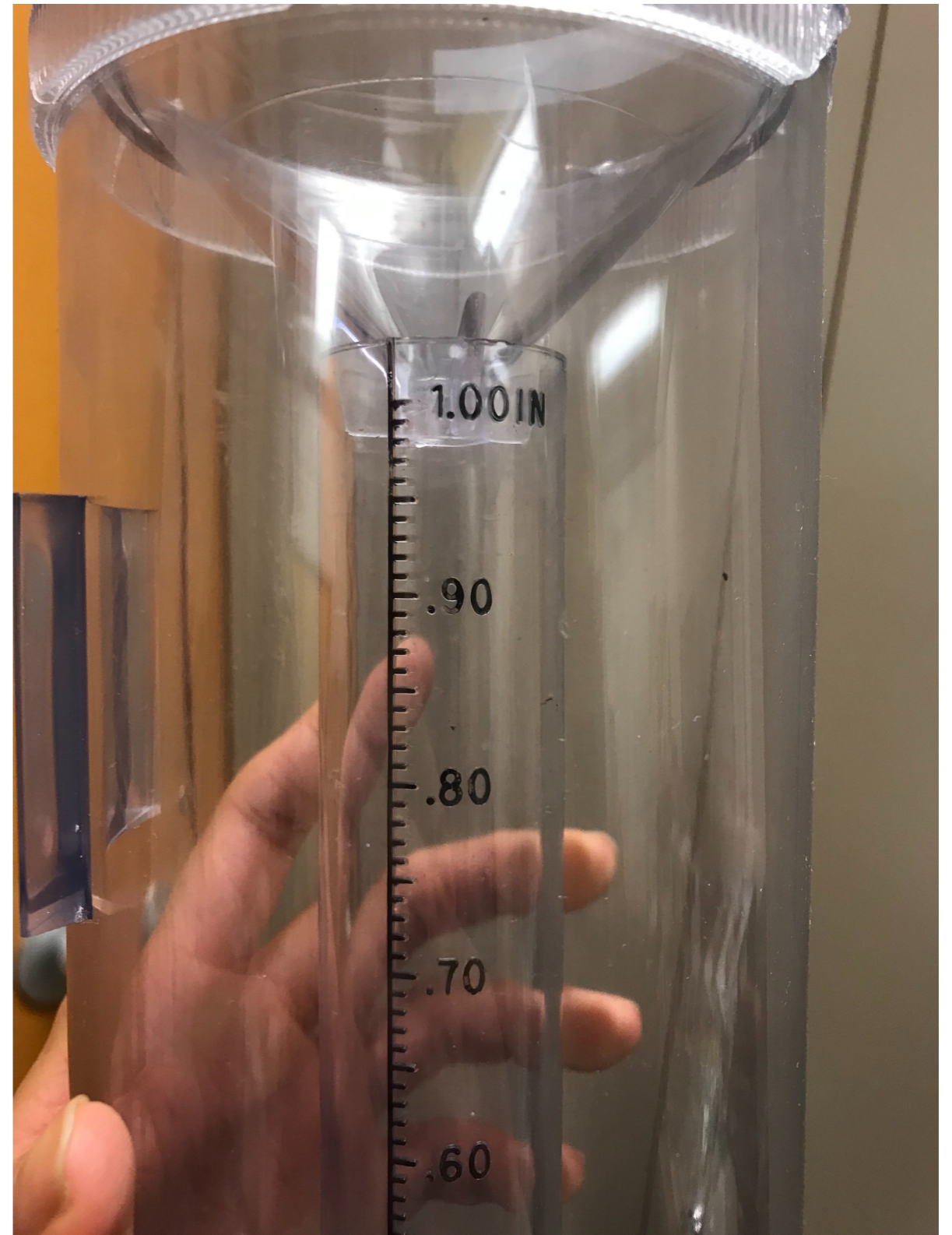
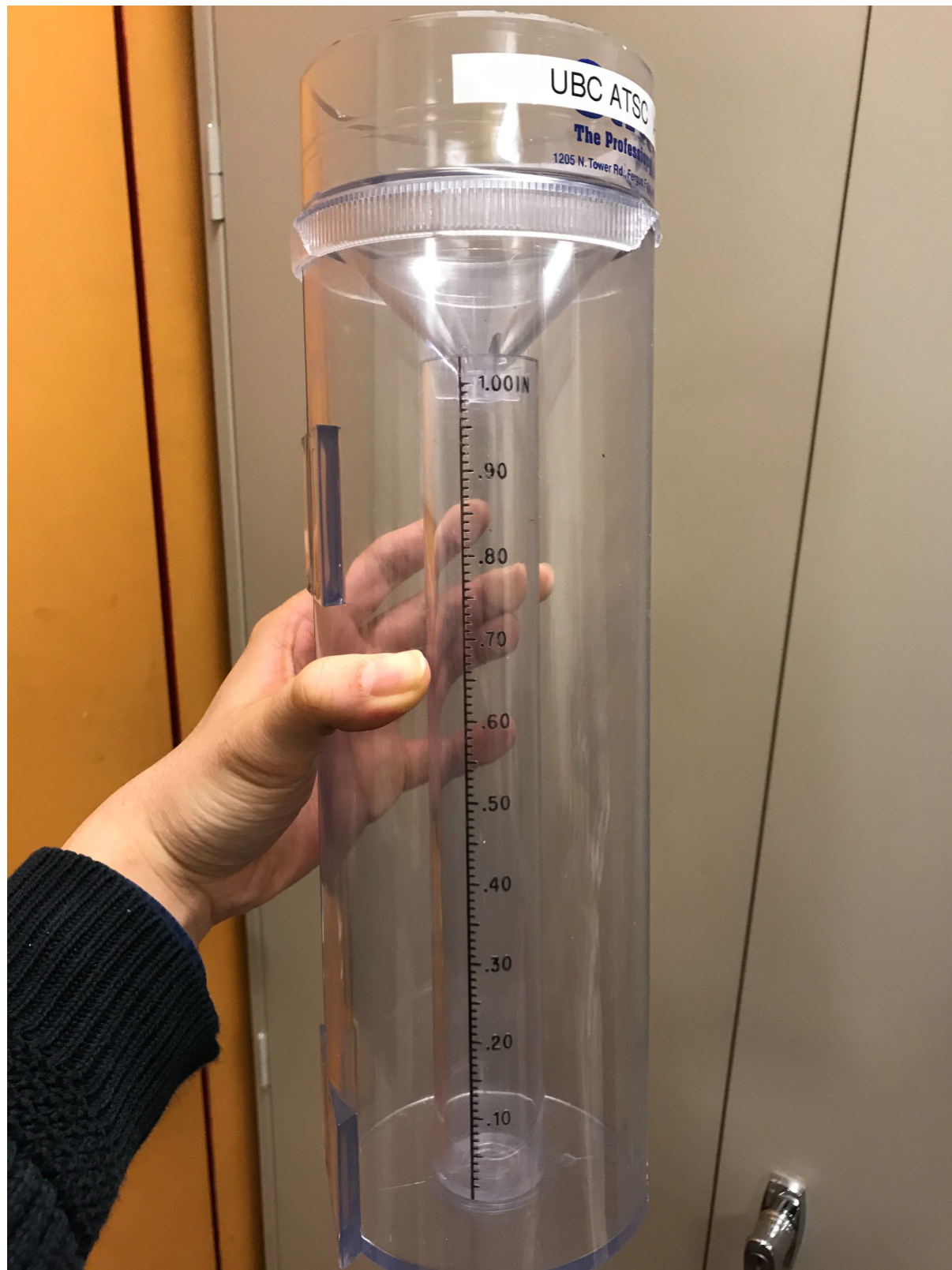
	By the end of today's class, you should be able to:
1	Bin precipitation rates into qualitative categories.
2	List at least 4 types of precipitation gauges and explain how they work.
3	Describe the advantages, disadvantages, and typical errors of each type of gauge
4	Describe ways to measure snow depth.
5	Explain typical difficulties in precipitation measurement and how they can be mitigated

# Demo Worksheet

Demo - Comparison of precipitation sensors  
 Worksheet by Rosie Howard  
 Edited by Tim Chui  
 Date of demo: 26 February 2020

	Instrument	What is it made of?	Principle	What does it measure?	Details
1	<b>Manual rain collector</b>	Plastic	Rain height or depth read directly from divisions on gauge	Rain accumulation (mm)	Rain rate can be calculated in terms of frequency that instrument is read e.g. mm/day, or mm/storm
2	<b>Tipping bucket rain gauge</b>	Plastic, usually black		Rain rate (m/s or mm/h)	Rain rate calculated from volume of tipping cup, catchment surface area, and number of tips per unit time  Plastic used in tipping cups specially formulated for low surface tension
3	<b>ParSiVeI disdrometer</b>		Optical; falling particles cast shadow on photodetectors causing voltage drop (relative to maximum voltage of lazer beam). <b>Particle size and velocity</b> (Parsivel) estimated from this.	Particle size spectrum, precipitation intensity (mm/h), precipitation type	Size range: 0.2-5 mm (liquid), 0.2-25 mm (solid)  Splash guards help break up and redirect raindrops  Also derives kinetic energy of hydrometeors, radar reflectivity, and visibility, based on theoretical or empirical equations
4	<b>Acoustic rain gauge</b>	Stainless steel surface		Rain rate, duration, accumulation	Can distinguish between rain and hail  No moving parts; little to no maintenance needed  Good for remote locations
5	<b>Snow ruler type 4</b>	Wood	Snow accumulation (depth) equivalent to length (height)	Snow depth (cm)	
6	<b>Sonic ranging sensor</b>	Transducer in aluminium housing		Distance to target (m)  Must measure distance to bare ground also, and take difference for snow depth.	

# Manual Rain Collector



# Tipping Bucket Rain Gauge



# Tipping Bucket Rain Gauge



# ParSiVel Disdrometer

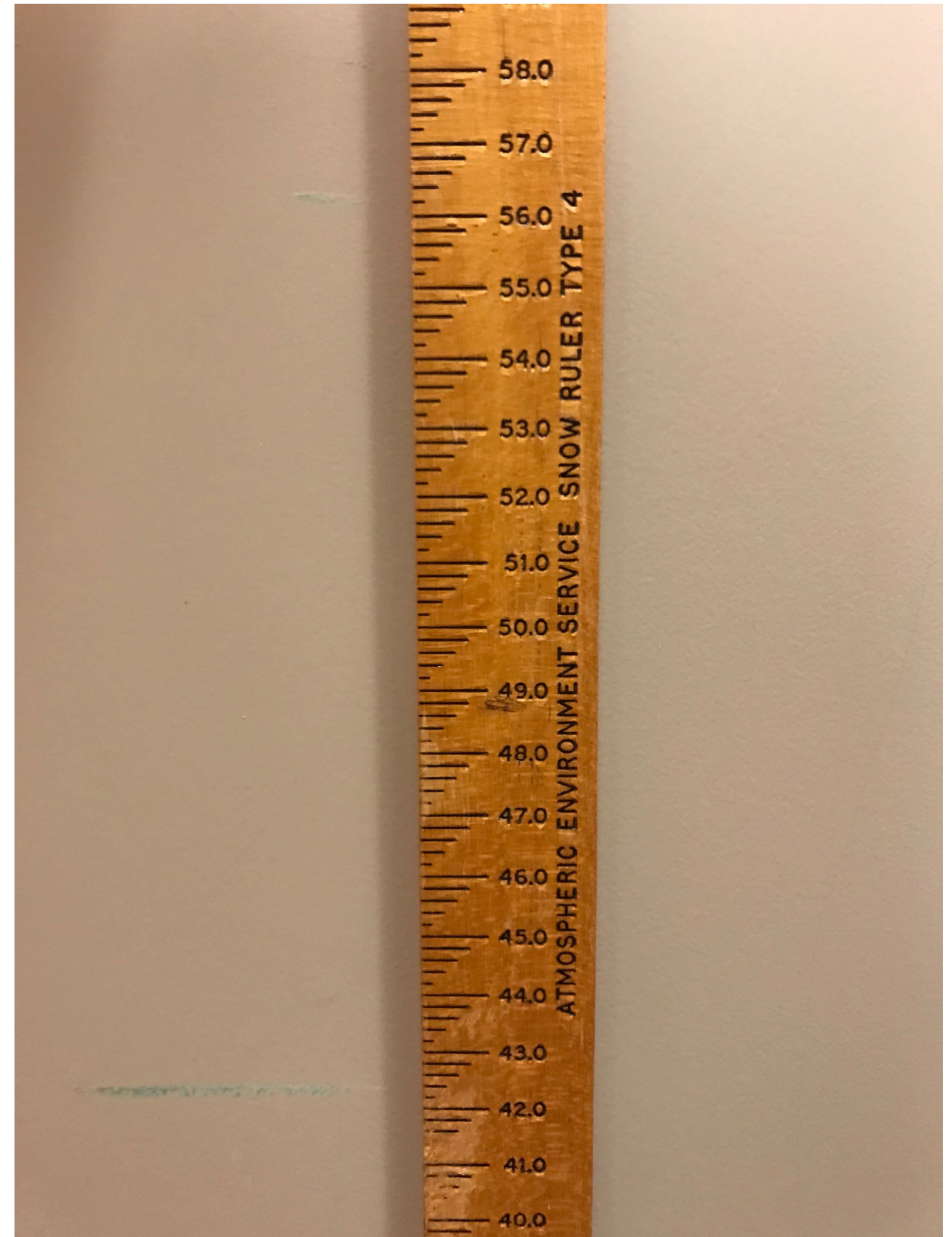


# Acoustic Rain Gauge





# Snow Ruler Type 4



# Sonic Ranging Sensor

