- **Discussion and practice**
- **Reading spectrograms**

Background:

- Midterm exam
- Lab #06 (German vowels)
- Prep questions: Nasals and approximants

0. Today's plan

- Discussion and questions: Midterm exam

- Discussion: Lab #06

- Check-in on the prep questions

- Reading spectrograms!

1. Midterm exam: Discussion

- Q (3): What does the spectrum of a complex wave represent?

- Q (5): What is the difference between wide-band and narrow-band spectrograms?

- Q (6): What happens when a speaker changes the source or the filter in a vowel?

- Other questions?

2. Lab #06: Discussion

- Adding rounding to a high front vowel

    - What does perturbation theory predict?

    - What does the multiple-tubes model predict?

    - What did you actually find?

- What was the most surprising vowel on the formant plot?

- Other questions?

3. Today's prep questions

- **Nasals and [l]** | Vocal tract of one speaker:
    - Glottis to uvula - 9cm
    - Uvula to nares (nostrils) - 12.5cm
    - Uvula to lips - 8cm
    - Uvula to alveolar ridge - 5.5cm

- What is the main tube   for [m]?   for [l]?

- What is the side tube   for [m]?   for [l]?

- Formants F1, F2, F3   for [m]?   for [l]?

- Antiformants AF1, AF2   for [m]?   for [l]?

3. Today's prep questions

- Where is the vocal-tract perturbed in **glides**?
  - [j] — **palatal** constriction
    - like a high front V
  - [w] — **labial** and **velar** constrictions
    - like a high back round V

- So what should formants look like in [w] and [j] compared to schwa? → **Prep questions**

4. Reading spectrograms

- Try dividing the speech into **segments** (individual consonants and vowels)

- Some things to look for:
  - Major class (vowel, stop, fricative, nasal, approximant)
  - Height and backness/rounding in vowels
  - Voicing in consonants
  - Place of articulation in consonants