SYLLABUS

Time: Tuesdays 2:00-5:00
Place: E51-393
Web page: www-rcf.usc.edu/~zuraw/964.html

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A common reaction to Optimality Theory (Prince & Smolensky 1993) is, “but how does it work?” For example, how can the optimal output be chosen from an infinite set of candidates? This and related questions have been addressed by a body of work dating from the early days of OT.

Work in computational OT has proposed algorithms for choosing a winning output candidate given an input form (generation: the speaker’s task), discovering an input form given an output form (parsing: the hearer’s task—actually, little has been done here), and determining a constraint ranking based on input-output mappings (acquisition: the child’s task). There has also been a limited amount of work on the computability of OT: does changing the theory in various ways make the speaker’s, hearer’s, or child’s task easier or harder?

Description
In this course, we will read and discuss the most important works in the computational OT literature. We will also try to answer (or at least lay the groundwork for answering) some questions that have not yet been addressed in the literature.

Along the way, we will cover some of the basics of the theory of computation: abstract computing devices, formal languages, learnability theory, computability theory, and complexity theory. Each of these topics could be a course in itself, so we really will cover just the basics.

Outside of class, you can experiment with OT software that has been written for learning, generation, and factorial typology.

Prerequisite
Basic knowledge of Optimality Theory (or willingness to learn it on your own within the first week). No computational or computer background is required.

Requirements for credit
- Homework assignments: around eight, some paper-and-pencil, some by computer
- Reading presentations: about two each, depending on class size
- Paper or project on a topic of your choice
**Homework**
The purpose of the assignments—which will be mainly sets of short exercises—is to get/keep you comfortable with notations and concepts that can be difficult to grasp and impossible to remember unless you get practice manipulating them yourself.

If you’re auditing the class, I encourage you to do the exercises anyway, when you can. I don’t plan to discuss them much in class, though, so they aren’t essential to participation.

You are encouraged to work together on homework, but write things up individually.

**Readings**
I’ll lecture on some readings; others will be presented by you, individually or in pairs.

In the course outline below, readings in *italics* are particularly suitable for student presentations.

A list of additional suggestions for student-presented readings is after the course outline. If you want to present something relevant that’s not on the list, that’s fine too.
Approximate course outline (subject to change)

<table>
<thead>
<tr>
<th>Class session</th>
<th>topic</th>
<th>readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Sept 11)</td>
<td>Computation and computability OT Review</td>
<td>Sipser (1997), ch. 0</td>
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<tr>
<td>3 (Sept 25)</td>
<td>• Constraint Demotion&lt;br&gt;• Gradual Learning Algorithm&lt;br&gt;• Other algorithms&lt;br&gt;• Learnability theory</td>
<td>Turkel (1994) Pulleyblank &amp; Turkel (1998)</td>
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<td>6 (Oct 23)</td>
<td>Generation</td>
<td>Eisner (1997) again</td>
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<tr>
<td>7 (Oct 30)</td>
<td>• Generation in OTP&lt;br&gt;• Other algorithms</td>
<td>Tesar &amp; Smolenksy (2000) ch. 8</td>
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<tr>
<td>10 (Nov 20)</td>
<td>OT vs. similar systems</td>
<td>Smolensky (2000) Frisch, Broe &amp; Pierrehumbert (1997)</td>
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</tbody>
</table>

References for readings listed above
* = available on ROA, though ROA version may not be the final one

*Frisch, Stefan, Michael Broe and Janet Pierrehumbert (1997). Similarity and phonotactics in Arabic.

*Hall, Daniel (2000). Infinity limited: Constraining a constraint-based theory. Generals paper, University of Toronto. Presented at NAPhC 1, Concordia University, Montreal.


**Other suggested readings for student presentations**


