

**A&AE 624 Laminar-Turbulent Transition
Fall 2016**

**Professor Steve Schneider
Final Project**

**Written Report Due: Monday, 12 December, 8:00am Eastern
Oral Summary Reports may be Scheduled During the Last Week of Class**

The remaining 3/4 of the grade is to be made up of this project. Please send me an email with your ideas for what you'd like to do, or talk to me after class. After discussion, please submit a one-page plan for my approval before beginning work.

The first option is to do computations using a stability-based scheme such as the e^N method. Estimate stability and/or transition in a flow of your choice. Compare your results to available data. Your report should describe the details of your prediction method, and convey a clear understanding of the stability characteristics of the flow. Some options for the computer project include running:

1. The codes in the Cebeci book (on reserve at the library). I also have two earlier books by Cebeci that include stability codes for e^{**N} type prediction methods. These seem like the most obvious thing to use, to compare against some test data. I have data for various configurations, 2d, axisymmetric, and 3d.
2. The ORRSOM code that computes TS waves for incompressible flow (code from Reynolds via Blaisdell)
3. The OSX code that uses ORRSOM and approx. to compute TS waves along an airfoil. (adapted by earlier students)
4. Koochesfahani's inviscid instability code for wake profiles
5. Xuming Su's finite-difference TS solver

For all of these we have the Fortran source code, which you would have to learn, understand, modify, and use to compare to some test case. Our Grader, Lalit Rajendran, is working on making a stability code more accessible to students for this project, so interested persons should coordinate with him. I am open to other possibilities. Some students may have access to other stability codes such as LSTRAC or STABL which they may wish to use.

The second option is to do a literature review. You may also combine some of both options.