Topics in Software Engineering, Fall 2013

Meeting Time: Wednesday and Friday, 9:30am-10:45am
Meeting Room: 1302 Siebel
Instructor: Tao Xie (NetID: taoxie)
TA: Adrian Nistor (NetID: nistor1)

List of Subpages: Syllabus, People, Projects, Papers, I2CS Specific Information

Schedule

Unless specified otherwise, all paper review reports are due before the beginning of the respective class (9:30am CST). Please see the syllabus for the review report format and submission instructions. For reading materials linked below that belong to certain digital libraries such as ACM/IEEE ones, don’t buy articles there if you access the links out of the campus network. Please follow the instructions here for accessing digital libraries.

Lecture videos will be available online at here.

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<th>Week</th>
<th>Date</th>
<th>Presenter</th>
<th>Reading</th>
<th>Slides</th>
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<tr>
<td>1</td>
<td>08/28W</td>
<td>Tao</td>
<td>Introduction</td>
<td>Logistic</td>
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|      | 08/30F | Tao       | How to Read an Engineering Research Paper
William G. Griswold
Writing Good Software Engineering Papers
Mary Shaw (ICSE 2003) | Skills |
| 2    | 09/04W | Tao       | Paper review reports NOT needed or due for this meeting
Teaching and Training Developer-Testing Techniques and Tool Support.
Tao Xie, Jonathan de Halleux, Nikolai Tillmann, and Wolfram Schulte (SPLASH 2010 Educators’ and Trainers’ Symposium)
Retrofitting Unit Tests for Parameterized Unit Testing.
Suresh Thummalapenta, Madhuri Marri, Tao Xie, Nikolai Tillmann, and Jonathan de Halleux. (FASE 2012) |
|      | 09/06F | Tao       | Paper review reports NOT needed or due for this meeting |
| 3    | 09/11W | Tao       | Paper review reports NOT needed or due for this meeting
Testing Introduction Book
Chapter
Paul Ammann and Jeff Offutt (Testing Textbook) |
|      | 09/13F | Tao       | Testing Intro
SQA |
<table>
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<tr>
<th>Date</th>
<th>Time</th>
<th>Name</th>
<th>Topic</th>
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<tr>
<td>09/20F</td>
<td></td>
<td>Tao</td>
<td>Continue discussion on the UDITA paper + Testing Intro</td>
<td>The problem with project risk management by Michelle Symonds</td>
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</table>
Proposal format guidelines: Make a project wiki page as a subpage under the Project wiki including the following contents (note that you can include multiple lists of bullet points in one paragraph in the contents):

- **Motivation of the project** (one paragraph): Why conduct a study or develop some tool features?
- **Objectives of the project** (one paragraph): What does this project plan to accomplish?
- **Subtasks/steps of the project and task/step workload distribution between the two members** (one paragraph):
  - How does this project accomplish the objectives in a phased process? In total, please plan roughly 10 weeks for the project duration. Please mark the estimated start time and end time for each subtask/step, e.g., "Step 1: collect evaluation subjects (Week 1-the middle of Week 2)."
  - For each subtask/step, how to distribute the workload to the two team members? You don't need to fill in such distribution information for an (approved) solo project.
  - Note that you can have multiple subtasks/steps concurrently or overlapping in the same period, and you can plan a subtask/step to be conducted by only one member (letting the other member to carry out another subtask/step) or plan a subtask/step to be conducted collaboratively by two members. In this case, please specify who does what for the subtask/step).
- **Risks items and risk management of the project** (one paragraph): What are risk items in the project? What risk management actions do you plan in order to manage such risk items?
- **GQM of the project** (one paragraph): What are the GQM of the project? Note that you may have multiple GQMs; in that case, list your GQM one by one.
- After you fill in the above contents, make an entry in the table in the Project wiki by filling in "Name(s)", "NetID(s)", and "Topic". Make a link from your filled "Topic" text to your project wiki page. If your project has a helper (e.g., the sponsor of your project), fill in also the helper's name in "Helper". No need to fill in "Progress" for now.
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| 6    | 10/2W| Tao  | Paper review report DUE (email submission to nistor1 and taoxie with title CS527 HW 10/2)
Only ONE review report for only ONE of the papers below is needed and due.

Angelic Debugging (ICSE 2011)
Satish Chandra, Emina Torlak, Shao Barman, Rastislav Bodik

Cause Clue Clauses: Error Localization Using Maximum Satisfiability (PLDI 2011) [tool]
Manu Jose and Rupak Majumdar |
| 6    | 10/4F| Tao  | Paper review report DUE (email submission to nistor1 and taoxie with title CS527 HW 10/4)
Only ONE review report for only ONE of the papers below is needed and due.

Using Dynamic Analysis to Discover Polynomial and Array Invariants (ICSE 2012) [project and datasets]
ThanhVu Nguyen, Deapak Kapur, Westley Weimer, and Stephanie Forrest

Generating Parameterized Unit Tests (ISSTA 2011)
Gordon Fraser and Andreas Zeller |
| 7    | 10/9W| W.Y. B.T. S.H. | Paper review report DUE (email submission to nistor1 and taoxie along with the student presenter with title CS527 HW 10/9)
Only ONE review report for only ONE of the papers below is needed and due.

Web/GUI Application Testing

Mobile-App Testing/Debugging
- Dynodroid: an input generation system for Android apps. (ESEC/FSE 2013) by Aravind Machiry, Rohan Tahiliani, Mayur Naik. [Tool]
- RERAN: timing- and touch-sensitive record and replay for Android (ICSE 2013) by Lorenzo Gomez, Julian Neamtu, Tanzhil Azim, Todd D. Millstein. [Tool] |
| 7    | 10/11F| C.N. P.S. S.S. | Paper review report DUE (email submission to nistor1 and taoxie along with the student presenter with title CS527 HW 10/11)
Only ONE review report for only ONE of the papers below is needed and due. |
<table>
<thead>
<tr>
<th>Date</th>
<th>Reviewer</th>
<th>Paper Title</th>
<th>Authors</th>
<th>Presenter</th>
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| 10/16W| V.M., P.G., G.O., J.M. | **Mining Specifications** - 10/16W                                           | - Graph-based Mining of Multiple Object Usage Patterns (ESEC/FSE 2009) by Tung Nguyen, Hoan Nguyen, Nam Pham, Jalar Al-Kotai, and Tien Nguyen (presented by V.M.)  
- Mining behavior models from enterprise web applications. (ESEC/FSE 2013) by Matthias Schur, Andreas Roth, Andreas Zeller (presented by P.G.)  
- Unifying FSM-inference algorithms through declarative specification. (ICSE 2013) by Ivan Beschastnikh, Yuriy Brun, Jenny Abrahamson, Michael D. Ernst, Arvind Krishnamurthy. [Tool] (presented by G.O.)  
- Mining Specifications of Malicious Behavior (ESEC/FSE 2007) by Mihai Christodorescu, Somesh Jha, Christopher Kruegel. (presented by J.M.) | Only ONE *review report for only *ONE *of the papers below is needed and due. |
| 10/18F| F.H., D.S., D.S. | **Environment Mocking** - 10/18F                                             | - Amplifying tests to validate exception handling code (ICSE 2012) by Pingyu Zhang and Sebastian Elbaum (presented by F.H.)  
- SymDrive: Testing Drivers without Devices (OSDI 2012) by Matthew J. Renzellmann, Asim Kadav, and Michael M. Swift. (presented by D.S.)  
- Declarative Mocking (ISSTA 2013) by Hesam Samimi, Rebecca Hicks, Ari Fogel, Todd Millstein [Benchmarks] (presented by D.S.) | Only *ONE *review report for only *ONE *of the papers below is needed and due. |
### Concurrent Testing /Analysis - 10/23W

- **Iterative Context Bounding for Systematic Testing of Multithreaded Programs** (PLDI 2007) by Madan Musuvathi and Shaz Qadeer (CHESS Tool) (presented by C.D.
- **Automatic testing of sequential and concurrent substitutability**. (ICSE 2013) by Michael Pradel, Thomas R. Gross. (presented by T.T.
- **Effective Static Deadlock Detection**. (ICSE 2009) by M. Naik, C.-S. Park, K. Sen, and D. Gay. (presented by A.P.

### Debugging - 10/25F

- **Reusing Debugging Knowledge via Trace-based Bug Search** (OOPSLA 2012) by Zhongxian Gu, Earl Barr, Drew Schleck, and Zhendong Su. (presented by M.F.
- **Debugging Reinvented: Asking and Answering Why and Why Not Questions about Program Behavior** (ICSE 2008) by Andrew Ko, Brad Myers. (presented by M.M.
- **SemFix: program repair via semantic analysis** (ICSE 2013) by Hoang Duong Thien Nguyen, Dawei Qi, Abhik Roychoudhury, Satish Chandra. (presented by S.L.)
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<th>Reviewer 3</th>
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| 10/30 | S.S. J.H. P.L. | Paper review report DUE (email submission to nistor1 and taoxie *along with the student presenter *with title CS527 HW 10/30) Only "ONE * review report for only "ONE * of the papers below is needed and due.**  
**Security Testing/Analysis - 10/30W**  
- Automatic creation of SQL Injection and cross-site scripting attacks, (ICSE 2009) by Adam Kiezun, Philip J. Gue, Karthick Jayaraman, and Michael D. Ernst. (Suggested by and assigned to S.S.)  
- Mining SQL injection and cross site scripting vulnerabilities using hybrid program analysis, (ICSE 2013) by Lein Khin Shar, Hee Beng Kuan Tan, Lionel C. Briand. (presented by J. H.)  
- Path sensitive static analysis of web applications for remote code execution vulnerability detection (ICSE 2013) by Yunhui Zheng, Xiangyu Zhang. (presented by P.L.) |
| 11/1 | S.D. H.D. S.O. | Paper review report DUE (email submission to nistor1 and taoxie *along with the student presenter *with title CS527 HW 11/1) Only "ONE * review report for only "ONE * of the papers below is needed and due.**  
**Security Analysis - 11/1F**  
- Analyzing inter-application communication in Android ( MobiSys 2011) by Erika Chin, Adrienne Porter Felt, Kate Greenwood, and David Wagner. (presented by H.D.)  
- Policy Auditing over Incomplete Logs: Theory, Implementation and Applications (CCS 2011) by Deepak Garg, Limin Jia, Anupam Datta (Suggested by and assigned to S.O.) |
| 11/6 | Y.L. T.T. L.M. | Paper review report DUE (email submission to nistor1 and taoxie *along with the student presenter *with title CS527 HW 11/6) Only "ONE * review report for only "ONE * of the papers below is needed and due.**  
**Fuzz Testing - 11/6W**  
- Grammar-based whitebox fuzzing (PLDI 2008) by Patrice Godefroid, Adam Kiezun, Michael Y. Levin (Suggested by and assigned to: Y.L.)  
- Billions and billions of constraints: whitebox fuzz testing in production, (ICSE 2013) by Ella Beunthova, Patrice Godefroid, David A. Mohar. (presented by T.T.)  
- Semi-valid input coverage for fuzz testing, (ISSTA 2013) by Peter Tsankov, Mohammad Torabi Dash, David A. Basin. (presented by L.M.) |
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| 11/8F | P.J. | Paper review report DUE (email submission to nistor1 and taoxie "along with the student presenter "with title CS527 HW 11/8") Only ONE review report for only ONE of the papers below is needed and due. Research Methodology - 11/8F  
- Diversity in software engineering research (ESEC/FSE 2013) by Meiyappan Nagappan, Thomas Zimmermann, Christian Bird. (presented by I.P.)  
| 11/13W | 11:59pm | Progress Report DUE See here for report guidelines | L.W. | Paper review report DUE (email submission to nistor1 and taoxie "along with the student presenter "with title CS527 HW 11/13") Only ONE review report for only ONE of the papers below is needed and due. Human Factors in Practice - 11/13W  
- Does bug prediction support human developers? findings from a google case study. (ICSE 2013) by Chris Lewis, Zhongpeng Lin, Caitlin Sadowski, Xiaoyan Zhu, Rong Ou, E. James Whitehead Jr. (presented by L.W.)  
- Why don't software developers use static analysis tools to find bugs? (ICSE 2013) by Brittany Johnson, Yoonki Song, Emerson R. Murphy-Hill, Robert W. Bowdidge. (presented by R. M.)  
- UML in practice (ICSE 2013) by Marian Petre. (presented by D.T.) |
<p>| 11/13W | Y.C. |  |  |  |</p>
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<tr>
<th>Date</th>
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<th>Paper Title and Summary</th>
<th>Authors and Presenters</th>
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| 11/15F     | A.M., S.S., P.T., J.S. | Paper review report DUE (email submission to nistor1 and taoxie *along with the student presenter *with title CS527 HW 11/15) Only "ONE *"review report for only "ONE *of the papers below is needed and due. | JavaScript Testing 11/15F  
- Invariant-Based Automatic Testing of AJAX User Interfaces (ICSE 2009) by Ali Mesbah, Ari van Deursen (presented by J. S.) |
| 11/20W     | F.Y., A.G., R.S. | Paper review report DUE (email submission to nistor1 and taoxie *along with the student presenter *with title CS527 HW 11/20) Only "ONE *"review report for only "ONE *of the papers below is needed and due. | Test Selection, Prioritization, Minimization - 11/20W  
- Interaction-based test-suite minimization. (ICSE 2013) by Dale Blue, Itai Segall, Rachel Tzoref-Brill, Aviad Zlotnick. (presented by F.Y.)  
- Effectively prioritizing tests in development environment. (ISSTA 2002) by Amitabh Srivastava and Jay Thilagaranjan. (presented by A.G.)  
- Oracle-based Regression Test Selection. (ICST 2013) by Tingting Yu, Xiao Qu, Mithun Acharya, and Gregg Rothermel. (presented by R. S.) |
| 13 | 11/22F | S.K.  
A.S.  
V.S.  
C.E.  | Paper review report DUE (email submission to nistor1 and taoxie along with the student presenter "with title CS527 HW 11/22")  
Only "ONE" review report for only "ONE" of the papers below is needed and due.  
Performance Analysis - 11/22F  
- Supporting swift reaction: automatically uncovering performance problems by systematic experiments. (ICSE 2013) by Alexander Wert, Jens Happe, Lucia Happe. (presented by A.S.)  
- Patterns of Memory Inefficiency (ECOOP 2011) by Adriana Chis, Nick Mitchell, Edith Schonberg, Gary Sventeky, Patrick O’Sullivan, Trevor Parsons, John Murphy. (presented by V.S.)  
- Performance Analysis Of Idle Programs (OOPSLA 2012) by Erik Altman, Matthew Arnold, Stephen Fink, Nick Mitchell [Tool] (presented by C.E.) |
| 14 | 11/29F | Thanksgiving  
Break |
| 15 | 12/4W | H.T.  
L.E.  
J.V.  
M.Z.  | Paper review report DUE (email submission to nistor1 and taoxie along with the student presenter "with title CS527 HW 12/4")  
Only "ONE" review report for only "ONE" of the papers below is needed and due.  
Regression Verification - 12/4W  
- KATCH: high-coverage testing of software patches, (ESEC/FSE 2013) by Paul Dan Marinescu, Cristian Cadar. [Tool] (presented by H.T.)  
- make test-zesti: A Symbolic Execution Solution for Improving Regression Testing (ICSE 2013) by Paul Dan Marinescu, Cristian Cadar [Tool] (presented by L.E.)  
- Regression tests to expose change interaction errors. (ESEC/FSE 2013) by Marcel Böhme, Bruno C. d. S. Oliveira, Abhik Roychoudhury. (presented by J.V.)  
15 12/6F | O.L.  
J.H.  
J.Y.  
B.A.  
Paper review report DUE (email submission to nistor1 and taoxie *along with the student presenter *with title CS527 HW 12/6)  
Only "ONE "review report for only "ONE "of the papers below is needed and due.  
Floating-Point Testing 
/Analysis - 12/6F  
  - Automatic Detection of Floating Point Exceptions (P OPL 2013) by Earl T. Barr, Thanh Vo, Vu Le, and Zhendong Su (presented by O.L.)  
  - On-the-fly Detection of Instability Problems in Floating-Point Program Execution (OOPSLA 2013) by Tao Bao and Xiangyu Zhang (presented by J.H.)  
  - Perturbing Numerical Calculations for Statistical Analysis of Floating-Point Program (In)Stability (ISSTA 2010) by Enyi Tang, Earl Barr, Xuandong Li, and Zhendong Su. (presented by J.Y)  
  - Finding rare numerical stability errors in concurrent computations. (ISSTA 2013) by Hana Chockler, Karine Even, Eran Yahav. (presented by B.A.)

16 12/11W | Last meeting

16 12/13F  
12/15Sun  
11:59pm US Central Time | Final project reports due

No Paper review report due for this lecture.