Syllabus

Week 1: Dates: Jan 7, Jan 9, Jan 11

Topics: Access control matrix, safety question, take-grant model, SPM

Reading: *text*, §2, 3–3.4; papers [TL13,Z+05]

Week 2: Dates: Jan 14, Jan 16, Jan 18

Topics: Expressive power of models, comparing models, security policies

Reading: *text*, §3.4–3.7, 4; paper [Bi96]

Week 3: Dates: Jan 21, Jan 23, Jan 25 [Jan 21: Martin Luther King, Jr. Day (university holiday)]

Topics: Confidentiality policies, Bell-LaPadula Model

Reading: *text*, §5.1–5.3, A; papers [Sa93]

Due: Jan 23: homework 1; Jan 23: project selection

Week 4: **Dates**: Jan 28, Jan 30, Feb 1;

Topics: Tranquility, System Z, assurance overview, assurance in building systems

Reading: text, §5.4–5.6, 19, 20; papers [D+06,Mi79]

Week 5: Dates: Feb 4, Feb 6, Feb 8

Topics: Assurance in building systems, integrity models, Biba, Clark-Wilson, trust models, avail-

ability models

Reading: *text*, §20, 6 (except 6.3), 7; papers [J+11,LO10]

Due: Feb 8: homework 2

Week 6: Dates: Feb 11, Feb 13, Feb 15

Topics: Availability models, hybrid models, Chinese Wall model, CISS model, ORCON, RBAC

Reading: *text*, §7, 8; papers [A+10,E+03,WB04]

Due: Feb 15: project progress report

Week 7: Dates: Feb 18, Feb 20, Feb 22 [Feb 18: Presidents' Day (university holiday)]

Topics: Basic policy composition, information flow mechanisms

Reading: *text*, §9.1, 17; papers [B+07]

Due: Feb 22: homework 3

Week 8: Dates: Feb 25, Feb 27, Mar 1 [Feb 25: no class (I am out of town)]

Topics: Information flow mechanisms, principles of secure design, confinement problem

Reading: text, §17, 14, 18.1–18.2; papers [SA06]

Week 9: Dates: Mar 4, Mar 6, Mar 8

Topics: Isolation, covert channel analysis, noninterference

Reading: §18, 9; papers [S+06,KR02]

Week 10: Dates: Mar 11, Mar 13, Mar 15 [Mar 15 is last class]

Topics: Noninterference, unwinding theorem, nondeducibility, restrictiveness

Reading: §9; papers [D+11] **Due**: Mar 15: homework 4

Mar 22: Due: Completed project due at 3:00pm

References

[A+10] C. Ardagna, S. di Vimercati, S. Foresti, T. Grandison, S. Jajodia, and P. Samarati, "Access Control for Smarter Healthcare Using Policy Spaces," *Computers & Security* **29**(8) pp. 848–858 (Nov. 2010). doi: 10.1016/j.cose.2010.07.001

[B+07] M. Backes, M. Dümuth, and D. Unruh, "Information Flow in the Peer-Reviewing Process (Extended Abstract)," *Proceedings of the 2007 IEEE Symposium on Security and Privacy* pp. 187–191 (May 2007). doi: 10.1109/SP.2007.24

- [Bi96] M. Bishop, "Conspiracy and Information Flow in the Take-Grant Protection Model," *Journal of Computer Security* **4**(4) pp. 331–359 (1996). doi: 10.3233/JCS-1996-4404
- [D+11] A. Datta, J. Franklin, D. Garg, L. Jia, and D. Kaynar, "On Adversary Models and Compositional Security," *IEEE Security & Privacy* **9**(3) pp. 26–32 (May 2011). doi: 10.1109/MSP.2010.203
- [D+06] P. Derrin, K. Elphinstone, G. Klein, D. Cock, and M. Chakravaty, "Running the Manual: An Approach to High-assurance Microkernel Development," *Proceedings of the 2006 ACM SIGPLAN Workshop on Haskell* pp. 60–71 (Sep. 2006). doi: 10.1145/1159842.1159850
- [E+03] A. El Kalam, R. El Baida, P. Balbiani, S. Benferhat, F. Cuppens, Y. Deswarte, A. Miège, C. Saurel, and G. Trouessin, "Organization Based Access Control," *Proceedings of the IEEE 4th International Work-shop on Policies for Distributed Systems and Networks* pp. 120–131 (June 2003). doi: 10.1109/POL-ICY.2003.1206966.
- [J+11] B. Javadi, D. Kondo, J.-M. Vincent, and D. Anderson, "Discovering Statistical Models of Availability in Large Distributed Systems: An Empirical Study of SETI@home," *IEEE Transactions on Parallel and Distributed Systems* 22(11) pp. 1896–1903 (Nov. 2011). doi: 10.1109/TPDS.2011.50
- [KR02] C. Ko and T. Redmond, "Noninterference and Intrusion Detection," *Proceedings of the 2002 IEEE Symposium on Security and Privacy* pp. 177–187 (May 2002). doi: 10.1109/SECPRI.2002.1004370
- [LO10] G. Loukas and G. Öke, "Protection Against Denial of Service Attacks: A Survey," *The Computer Journal* **53**(7) pp. 1020–1037 (2010). doi: 10.1093/comjnl/bxp078
- [Mi79] J. Millen, "Operating System Security Verification," MITRE Corp., Bedford, MA (1979).
- [S+06] G. Shah, A. Molna, and M. Blaze, "Keyboards and Covert Channels," *Proceedings of the 15th USENIX Secu*rity Symposium pp. 59–78 (Aug. 2006). url: https://www.usenix.org/legacy/event/sec06/tech/shah/shah.pdf
- [Sa93] R. Sandhu, "Lattice-Based Access Control Models," *IEEE Computer* **26**(11) pp. 9–19 (Nov. 1993). doi: 10.1109/2.241422
- [SA06] J. Soon and J. Alves-Foss, "Covert Timing Channel Analysis of Rate Monotonic Real-Time Scheduling Algorithm in MLS Systems," *Proceedings of the 2006 IEEE Information Assurance Workshop* pp. 361–368 (June 2006). doi: 10.1109/IAW.2006.1652117
- [TL13] M. Tripunitara and N. Li, "The Foundational Work of Harrison-Ruzzo-Ullman Revisited," *IEEE Transactions on Dependable and Secure Computing* **10**(1) pp. 28–39 (Jan. 2011). doi: 10.1109/TDSC.2012.77
- [WB04] T. Walcott and M. Bishop, "Traducement: A Model for Record Security," *ACM Transactions on Information and System Security* **7**(4) pp. 576–590 (Nov. 2004). doi: 10.1145/1042031.1042035
- [Z+05] X. Zhang, Y. Li, and D. Nalla, "An Attribute-Based Access Matrix Model," Proceedings of the 2005 ACM Symposium on Applied Computing pp. 359–363 (Mar. 2005). doi: 10.1145/1066677.1066760