ELE523E Computational Nanoelectronics, Fall 2020

Presentation Rules and Topics

RULES:

- Each student makes his/her presentation in **25** minute time span, **20** minutes for the presentation and **5** minutes for the questions/comments.
- Presentation topics and corresponding papers are listed below. The presentations should be mainly constructed on the listed papers; however it is encouraged to use/refer other papers and sources.
- All students, not just the presenter, are expected to read the related papers before presentations. Students are expected to ask (tough☺) questions to the presenter.
- Students are graded considering the presentation **clarity/quality** and also the presenter's **knowledge** on the topic.

W10 (21/12/2020) TOPICS; 3 PRESENTATIONS:

- **W10-P1, Emre Erdem, Reversible Computing:** Maslov, D., Dueck, G. W., & Miller, D. M. (2005). Toffoli network synthesis with tem plates. *Computer-Aided Design of Integrated Circuits and Systems, IEEE Transactions on*, *24*(6), 807-817.
- **W10-P2, Eşref Temel, Molecular Computing:** Cardelli, L. (2013). Two-domain DNA strand displacement. *Mathematical Structures in Computer Science*, 23(2), 247-271.
- **W10-P3, Aytug Ormancı, Molecular Computing:** Su, H., Xu, J., Wang, Q., Wang, F., & Zhou, X. (2019). High-efficiency and integrable DNA arithmetic and logic system based on strand displacement synthesis. *Nature communications*, 10(1), 1-8.

W11 (28/12/2020) TOPICS; 4 PRESENTATIONS:

- **W11-P1, Sadık İlik, Nanoarray based Computing:** DeHon, A. (2003). Array-based architecture for FET-based, nanoscale electronics. *Nanotechnology, IEEE Transactions on*, *2*(1), 23-32.
- **W11-P2, Tuna Mert Şenol, Nanoarray based Computing:** Strukov, D. B., & Likharev, K. K. (2012). Reconfigurable nano-crossbar architectures. *Nanoelectronics, R. Waser, Eds*.
- **W11-P3, Özgün Serttek, Nanoarray based Computing:** Bishop, M. D., Hills, G., Srimani, T., Lau, C., Murphy, D., Fuller, S., ... & Shulaker, M. M. (2020). Fabrication of carbon nanotube field-effect transistors in commercial silicon manufacturing facilities. *Nature Electronics*, 1-10.

- **W11-P4, Melih Bilmez, Nanoarray based Computing:** Akkan, N., Safaltın, S., Aksoy, L., Cevik, I., Sedef, H., Moritz, C. A., & Altun, M. (2020). Technology Development and Modeling of Switching Lattices Using Square and H Shaped Four-Terminal Switches. *IEEE Transactions on Emerging Topics in Computing*.

W12 (4/1/2021) TOPICS; 4 PRESENTATIONS:

- **W12-P1, Cihan Ürtekin, Stochastic Computing:** Vahapoglu, E., & Altun, M. (2018). From Stochastic to Bit Stream Computing: Accurate Implementation of Arithmetic Circuits and Applications in Neural Networks. *arXiv preprint* arXiv:1805.06262.
- **W12-P2, Burak Acar, Approximate Computing:** Han, J., & Orshansky, M. (2013, May). Approximate computing: An emerging paradigm for energy-efficient design. *In Test Symposium (ETS)*, 2013 18th IEEE European (pp. 1-6). IEEE.
- **W12-P3, Bahadır Özkan, Approximate Computing:** Gupta, V., Mohapatra, D., Park, S. P., Raghunathan, A., & Roy, K. (2011, August). IMPACT: imprecise adders for low-power approximate computing. In Proceedings of the 17th *IEEE/ACM international symposium on Low-power electronics and design* (pp. 409-414). IEEE Press.
- **W12-P4, İbrahim Taştan, Approximate Computing:** Venkatesan, R., Agarwal, A., Roy, K., & Raghunathan, A. (2011, November). MACACO: Modeling and analysis of circuits for approximate computing. In Proceedings of the *International Conference on Computer-Aided Design* (pp. 667-673). IEEE Press.

W13 (11/1/2021) TOPICS; 3 PRESENTATIONS:

- **W13-P1, Melih Kahraman, Fault Tolerance for Nanoarrays:** Hogg, T., & Snider, G. (2008). Defect-tolerant logic with nanoscale crossbar circuits. In *Emerging Nanotechnologies* (pp. 5-32). Springer US.
- **W13-P2, Özgen Köklü, Fault Tolerance for Neural Networks**: Li, Y., Liu, Y., Li, M., Tian, Y., Luo, B., & Xu, Q. (2019, December). D2NN: a fine-grained dual modular redundancy framework for deep neural networks. In Proceedings of the *35th Annual Computer Security Applications Conference* (pp. 138-147).
- **W13-P3, Taha Keleş, Fault Tolerance for Neural Networks**: Hoang, L. H., Hanif, M. A., & Shafique, M. (2020, March). Ft-clipact: Resilience analysis of deep neural networks and improving their fault tolerance using clipped activation. In 2020 *Design, Automation & Test in Europe Conference & Exhibition* (DATE) (pp. 1241-1246). IEEE.