

<u>Date</u>	<u>Topic</u>	<u>Ideas; Themes</u>	<u>Readings</u>	<u>Lab Assignments</u>
9/27/16	What is Intermittent Computing?	long history, key issues are "computing service" and "resource" models	Linkow, Livny, Mutka. Condor – Hunter of Idle Workstations, 8th International Conference on Distributed Computing Systems, 1988. Kondo, etal, Characterizing resource availability in enterprise desktop grids, Future Generation Computer Systems 23 (7), 888-903; Yang, etal, ZCCloud: Exploring wasted green power for high-performance computing, IPDPS 2016.	Serverless Jumpstart (out)
9/29/16	Resource Models and Zero Carbon Cloud Vision	Cost <u>and</u> Capabilities; Computing Models and resource models		
	Oct 3, Guest: Rich Wolski - Probabilistic Guarantees of Execution Duration for Spot Instances		Wolski, et. al. Probabilistic Guarantees of Execution Duration for Amazon Spot Instances; Yi, etal. Monetary Cost-Aware Checkpointing and Migration on Amazon Cloud Spot Instances. IEEE Trans. Serv. Comput. 5, 4 (January 2012), 512-524.	Serverless Jump-start(in)
10/4/16	Intermittent Computing	Volatile resources; prediction, reshaping Intelligent management, and Benefits of using volatile	Chard, etal. Cost-aware Cloud Provisioning, 2015 IEEE 11th Conference on eScience;	Project Brainstorm
10/6/16	Guest: Ravi Madduri - Using Spot Instances for Genomics Pipelines			Innovative Serverless (in)
10/7/2016 (Friday)				
10/11/16	Lab 1 Learnings Discussion		Ben-Yehuda, etal. Deconstructing Amazon EC2 Spot Instance Pricing, ACM Transactions on Economics and Computation archive Volume 1 Issue 3, September 2013; Sharma, etal. SpotCheck: designing a derivative IaaS cloud on the spot market. In Proceedings of the Tenth European Conference on Computer Systems (EuroSys '15).	Unreliable VM (out)
10/13/16	Spot instance markets	Understanding pricing;reshaping		
10/18/16	Serverless Computing and Actors	Computing with no resource model	various web links; actor model Greenpeace. Clicking clean: How companies are creating a green internet: 2015 update. <a href="http://www.greenpeace.org/usa/wp-content/uploads/legacy/Global/usa/planet3/PDFs/2015ClickingClean.pdf">http://www.greenpeace.org/usa/wp-content/uploads/legacy/Global/usa/planet3/PDFs/2015ClickingClean.pdf</a> ; E3, Investigating a Higher Renewable Portfolio Standard in California: Summary; A. A. Chien et al., "The zero-carbon cloud: High-value, dispatchable demand for renewable power generators," The Electricity Journal, pp. 110–118, 2015.	Project Brainstorm
10/20/16	Zero-carbon Cloud	clouds and carbon; renewables challenges		Project Brainstorm
10/21/16				Unreliable VM (in)

Power grid and resource 10/25/16 intermittence	Stranded power, grids, and intermittence	Barnhart, etal. The energetic implications of curtailing versus storing solar- and wind-generated electricity, Journal Energy and Environmental Science, 2013, 6(10), pages 2804--2810; Kibaek Kim, Fan Yang, Victor Zavala, and Andrew A. Chien, "Data Centers as Dispatchable Loads to Harness Stranded Power", IEEE Transactions on Sustainable Energy, 2016; ZCCloud-IPDPS Paper (see before)
10/27/16 Intermittent storage (distributed)	peer-to-peer; serving from unreliable	<a href="https://en.wikipedia.org/wiki/Napster">https://en.wikipedia.org/wiki/Napster</a> (read up to 2002); Stoica, etal. Chord: a scalable peer-to-peer lookup protocol for internet applications. IEEE/ACM Trans. Netw. 11, 1 (February 2003), 17-32; Wikipedia: Bittorrent-Protocol, Hawkes-Bittorrent.pdf Amin Shokrollahi. Raptor codes. IEEE/ACM Trans. Netw. 14, SI (June 2006), 2551-2567. Xia, et. al. RobuSTore: a distributed storage architecture with robust and high performance. ACM/IEEE conference on Supercomputing (SC '07). 2007.
Erasure codes and Exploitation in 11/1/16 Storage 11/3/16 Class Cancelled 11/4/2016 (Friday) 11am, Stephen Fink, "Open Whisk"	coding, flexiblty, variation	<a href="https://developer.ibm.com/openwhisk/">https://developer.ibm.com/openwhisk/</a> 3-page Project Plan
11/8/16 Elastic storage (data center) 11/10/16 Class Cancelled 11/11/2016 (Friday) Project Pitches	p2p into elastic- reliable in cloud	DeCandia, etal. Dynamo: amazon's highly available key-value store. Proceedings of twenty-first ACM SIGOPS symposium on Operating systems principles Pages 205-220; Huang, etal., Erasure Coding in Windows Azure Storage, 2012 USENIX Annual Technical Conference (USENIX ATC 12), 2012.
11/15/16 Class Cancelled 11/17/16 Class Cancelled		Makeup Class
11/18/2016 Makeup Class, Implementing (Friday) Serverless Computing	auto-scaling, latency management	Doyle, etal., Cloud Instance Management and Resource Prediction for Computation-as-a-Service Platforms. IC2E 2016: 89-98
Project Focus, Progress 11/22/16 Presentations 11/24/16 Class Cancelled Thanksgiving Holiday		Full Project Plan, all experiments, current status
11/29/16 Intermittent at Micro-scale 12/1/16 Reading Period (no class)		Lucia, etal. A simpler, safer programming and execution model for intermittent systems. In Proceedings of the 36th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI '15).
12/6/16 Final Project Presentations 12/8/16 Final Project Reports Due		