

# DARTS Lab Course – September 10-13, 2018

Course 1: Darts/Dshell Framework

Course 2: DSENDS for EDL

	Mon	Tue	Wed	Thu
	<b>COURSE 1 – DARTS/Dshell SIMULATION FRAMEWORK &amp; TOOLS</b>		<b>COURSE 2: DSENDS FOR EDL</b>	
8am	<b>1A. Welcome &amp; Agenda</b> Agenda, notebooks, Python, history, resources, docs, Dsends, Roams, etc	<b>1I. Data Logging</b> Logging with DwatchHDF5, cfg files, DVar log utilities	<b>MODELS</b>	<b>ANALYSIS</b>
9am	<b>1B. Math library</b> Vectors, matrices, Spatial vectors & inertia, quaternions, Euler, Aerospace vs robotics, Hom Trans, Phi/PhiStar <b>1C. Frames</b> Frames layer, edges, chains transoms, vels, accels, callbacks <b>1D. Data Access Layer</b> Access to simulation variables <b>1E. Multibody (Ndarts)</b> Bodies, nodes, hinges, subgraphs, prescribed motion	<b>1J. Visualization</b> Part graphics, Viewing frames, lighting, viewports, visibility, etc. <b>1K. SimScape</b> Terrain modeling <b>1L. ROAMS ground vehicles</b> Ground vehicle models, terramechanics, cameras <b>1M. Flex body dynamics</b> Deformable bodies, linearization, NASTRAN I/F	<b>2C. Central Body &amp; Gravity</b>	<b>2J. Sim management</b>
10am			<b>2D. Vehicle Modeling</b>	<b>2K. Variability and Uncertainty Quantification</b>
11am			<b>2E. Propulsion system</b>	<b>CASE STUDIES</b> <b>2L. Pre-Design Studies (Sample Return Lander)</b>
	<b>2F. Aerodynamics</b>	<b>2M. Active Flight (Mars 2020)</b>		
12pm	<b>LUNCH</b>	<b>LUNCH</b>	<b>LUNCH</b>	<b>LUNCH</b>
1pm	<b>1F. Dshell Architecture</b> Goals, overview of models and assemblies and other fundamental components <b>1G. Dshell models</b> Model classes, Flows, Darts models, I/F with DARTS params methods, multirate, sequencing, masking <b>1H. Assemblies</b> Config/context, Params, Checking, Builder, pre-fabs, Methods, signal ties	<b>Course 2: DSENDS for EDL</b>	<b>2G. Inertial sensors</b> <b>2H. Terrain relative sensors</b> <b>2I. GNC closing the loop</b>	<b>WALKTHROUGH</b> <b>2N. Simulation walkthrough</b>
2pm		<b>FUNDAMENTALS</b>		
3pm		<b>2A. EDL Analysis Overview</b> <b>2B. Basic sim fundamentals</b>		
4pm	<b>Discussion/Follow ups</b>	<b>Discussion/Follow ups</b>	<b>Discussion/Follow ups</b>	<b>Wrap up</b>