

Short Course Initiative

October 2019

Short Course Committee:

Stefano Coraluppi (Chair), Lorenzo Lo Monte, Laila Moreira, Luke Rosenberg, Michael Wicks, Jason Williams

Judy Scharmann (Administrative Support)



Overview

- AESS Short Course (ad hoc) Committee was first established in 2018
- Business model
 - 1-5 day courses to be hosted by AESS Chapters
 - Provides a lengthier presentation than DL program, allowing educational/professional development
 - Fee for participation. AESS Chapter covers speaker/venue honorarium and costs (with seed money). Surplus 20% to AESS, 80% to Chapter
- Program info is available online
 - <http://ieee-aess.org/short-course>

Current course offerings¹

- Introduction to Airborne Radar
 - Hugh Griffiths
 - 3-day course



- Introduction to Electronic Warfare
 - Lorenzo Lo Monte
 - 1-5 day course



Current course offerings²

- Radar Systems Prototyping
 - Lorenzo Lo Monte
 - 1-2 day course

- Over-The-Horizon Radar
 - Giuseppe Fabrizio
 - 1-day course



Current course offerings³

- Basic Algorithms for Target Tracking

- David Crouse
- 2-day course



- Introduction to Systems Engineering

- Bob Rassa
- 1-2 day course



Current course offerings⁴

■ Radar Fundamentals

- Maria S. Greco
- 5-day course



■ Inertial Navigation Systems and Aiding

- Michael Braasch
- 1-5 day course



Current course offerings⁵

- Knowledge Based Radar Signal, Image, and Data Processing
 - Michael Wicks
 - 2-day course

- Machine and Deep Learning for Data Fusion
 - Subrata Das
 - 1-2 day course



Completed and planned courses

- Seven courses held to date (four in 2019)
- Initial planning for 2020 courses
 - Crouse (Boston)
 - Fabrizio (Brazil)
 - Rassa (DC area)
 - Wicks (Dayton)

Radar Technologies
Instructor: Lorenzo Lo Monte
2-day course - October 2019
Host: Bolivia Chapter

Over-the-Horizon Radar
Instructor: Joe Fabrizio
1-day course given twice - August 2019
Host: AESS in South Australia

Radar Systems and Electronic Warfare
Instructor: Lorenzo Lo Monte
5-day course - August 2019
Host: Dayton Section Chapter

Basic Algorithms for Target Tracking
Instructor: David Crouse
2-day course - June 2019
Host: South Australia Chapter

Electronic Warfare
Instructor: Lorenzo Lo Monte
2-day course - October 2018
Host: Fraunhofer FKIE and AESS Germany Chapter

Radar System Prototyping and Electronic Warfare
Instructor: Lorenzo Lo Monte
3-day course - November 2017
Host: IEEE South Australia Chapter

Introduction to HF Over-the-Horizon Radar
Instructor: Joe Fabrizio
1-day course - November 2015
Host: IEEE South Australia Chapter

Example of Recent Course



IEEE IEEE South Australia Section
Control & Aerospace and Electronic Systems Chapter

Two Day Workshop
Basic Algorithms for Target Tracking

The IEEE SA Section and C&AES Chapter invites you to attend a two day workshop by
Dr David Crouse - Radar Division, Naval Research Laboratory USA

About the workshop:
This course goes through a variety of components that arise in target tracking algorithms, with a focus on single-scan algorithms. In many areas, reference is made to functions in the open-source copy left-free Tracker Component Library (available online) so that attendees can rapidly apply the algorithms that are discussed. The presentation slides containing additional derivations will be made available. A full course outline is given on the next page.



About the presenter:
David Frederic Crouse received B.S., M.S., and Ph.D. degrees in Electrical Engineering in 2005, 2008, and 2011 from the University of Connecticut (UCONN). He also received a B.A. degree in German from UCONN for which he spent a year at the Ruprecht-Karls Universität in Heidelberg, Germany. He is the recipient of the 2016 Young Investigator Award from the International Society on Information Fusion and the recipient of a 2015 Alan Berman Research Publication award from the Naval Research Laboratory for the paper "Basic Tracking Using Nonlinear Continuous-Time Dynamic Models." He is currently employed at the Naval Research Laboratory in Washington, D.C. and serves as associate editor in chief at the IEEE Aerospace and Electronic Systems Magazine.

Date: 17-18 June 2019
Time: 9:00 am - 5:00 pm

Venue:
Ingkarni Wardli 218 Collaborative Teaching Suite
University of Adelaide
North Terrace Adelaide

Registration through
[Eventbrite](#)

Early bird registration closes May 3 2019




Attendance Costs (ex. GST)

	Early Bird	Regular
DST Group Employee* (course sponsor)	Free	Free
Non-IEEE Member	\$450	\$500
IEEE Member**	\$400	\$450
Student*		\$200

Contact:
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* DST Group employees and students need to show ID when registering.
** IEEE membership discount applies to current IEEE members.




IEEE South Australia Section, C&AES Chapter
Basic Algorithms for Target Tracking

Course Content*

- 1) Introduction
- 2) Basic Estimation
 - Mathematical Concepts
 - Mathematical Coordinate Systems
 - Signal Processing Topics
 - Measurement Conversion
 - Parameter Estimation
 - Bayesian Estimation
 - Assessing Estimator Performance
 - Nonlinear Measurement Updates
 - Track Initiation
 - Linear Dynamic Models
- 3) Nonlinear Dynamics
 - Deterministic Differential Equations
 - Stochastic Dynamic Models
 - Nonlinear Continuous-Time Propagation
 - Celestial and Terrestrial Coordinate Systems
 - Basic Orbital Dynamics
- 4) Estimation with Model Mismatches
 - Simple Robustness Techniques
 - Alternative Filters
 - Multiple Model Algorithms
- 5) Target-Measurement Association
 - Cost Functions for Measurement Assignment
 - Single-Scan Assignment Algorithms
 - Comments on Beams
 - Single Scan Track Confirmation and Termination
 - Offline Performance Prediction
 - Multiframe Assignment
- 6) Estimation with High Nonlinearity
 - Particle Filtering
 - Particle Flow Filtering
 - Track Initiation with Any Type of Measurement

* Final content may differ slightly



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Current priorities

- Expand “supply”
 - Engage AESS Chapter Chairs
 - Direct targeting of DLs, tutorial speakers, panel members
- Expand “demand”
 - Engage AESS Chapter Chairs
 - Advertise regularly in QEB and Systems Magazine
 - Coordinate with VP Industry
- Facilitate logistics
 - Flexibility on funding model (allow low-profit events)
 - Flexibility on host model (conduct AESS-run event)
(<https://www.ieee.org/conferences/organizers/conference-application-form.html>)

Further information

- See <http://ieee-aess.org/short-course>
- Resources include
 - Instructor application
 - Sample course advertising flyer
 - IEEE vTools information to manage registrations and payments
 - Budget template
- Contacts
 - Stefano Coraluppi (stefano.coraluppi@ieee.org)
 - Judy Scharmann (j.scharmann@conferencecatalysts.com)