

Welcome Message from General Chairs

Conference General Chairs of IEEE PHM-Qingdao 2019. From left to right: Professors Steven Li, Hongyong Fu, Yunliang Tan, and Tianran Lin.

On behalf of the Organizing Committee, I welcome you to the 10th IEEE Prognostics and System Health Management Conference (PHM-Qingdao 2019) and welcome to Qingdao, a premiere tourist city. Please look forward to an exciting conference and the opportunity to attend many groundbreaking presentations of the latest applications, research and development in the PHM discipline. I hope that you will have a chance to make some new professional contacts, so you can leverage what you learn to your job, thus benefiting yourself and your company or university.

PHM goes hand-in-hand with Reliability as PHM can directly improve effective reliability, availability, mission reliability, system safety, and maintainability by being able to provide on-condition health, predict failures and future health status. The PHM-Qingdao 2019 aims to provide a premier international forum where leading experts and engineers with various backgrounds and experiences in PHM field can share their newest ideas, cutting-edge research results, methodologies, and tools with their peers.

A successful conference relies on many dedicated individuals serving as conference chairs, advisory committee, program committee, organizing committee, and secretariat as well as many participants and volunteers. Supports from all sponsoring organizations listed in this program are highly appreciated.

I hope that you will have a wonderful experience in Qingdao, and look forward to your attending for our future conferences.

Sincerely,

Zhaojun Steven Li, PhD

On behalf of the IEEE PHM-Qingdao 2019 Conference Organizing Committee
Vice President for Publications of IEEE Reliability Society

Program at a Glance

TIME TABLE

Date Time	October 25 (Friday)	October 26 (Saturday)		October 27 (Sunday)
08:00-12:00	Registration			
	Tutorial 1	Opening Ceremony		Oral Sessions C
		Keynote Speech 1		
	Break	Tea Break		
	Tutorial 2	Keynote Speech 2		Oral Sessions D
		Keynote Speech 3		
12:00-13:30		Lunch		Lunch
13:30-18:00	Tutorial 3	Keynote Speech 4	Panel sessions & Oral sessions A	Oral Sessions E
		Keynote Speech 5		
		Invited Talk		
	Break	Tea Break		
	Tutorial 4	Panel sessions & Oral Sessions B		Oral Sessions F
18:00-20:00		Conference Banquet		Dinner

Detailed Timetable**October 25 [Friday] 08:00-18:00**

Time \ Room	Meeting Room 5 (Second Floor)
08:00-18:00	Registration
08:30-10:00	Tutorial 1 “ Deep Learning Theory with Application in Aircraft Intelligent Fault Diagnosis” <i>Presenter: Professor Hongkai Jiang, Northwestern Polytechnical University</i>
10:00-10:30	Break
10:30-12:00	Tutorial 2 “ Data Driven Life Prediction Methods for Equipment” <i>Presenter: Professor Changhua Hu, Rocket Force University of Engineering University</i>
12:00-13:30	
13:30-15:00	Tutorial 3 “An Introduction to Belief Reliability Theory” (In Chinese) <i>Presenter: Professor Rui Kang, Beihang University</i> <i>Professor Xiaoyang Li, Beihang University</i>
15:00-15:30	Break
15:30-17:00	Tutorial 4-“Prognostics and Three R’s [Reliability, Robustness and Resilience] of Engineering” <i>Presenter: Dr. Kailash [Kal] Kapur, P.E., University of Washington</i>
18:00	

October 26 [Saturday] 08:00-18:00

TIME TABLE

Time \ Room	Grand Ballroom (First Floor)	
08:00-18:00	Registration	
08:30-09:00	Opening Ceremony	
09:00-09:50	Chair: Prof. Lirong Cui Beijing Institute of Technology, Beijing, China	Keynote Speech 1: A Brief History and Principles of Prognostics <i>Dr. Kailash [Kal] Kapur, P.E., University of Washington</i>
09:50-10:40	Chair: Prof. Xiaoyan Zhu University of the Chinese Academy of Science, Beijing, China	Keynote Speech 2: Opportunities and Challenges of AI for System Reliability and Prognostics <i>Professor Min Xie, City University of Hong Kong</i>
10:40-11:10	Tea Break	
11:10-12:00	Chair: Prof. Ming J. Zuo University of Alberta Alberta, Canada	Keynote Speech 3: Internet of Things (IoT) Trust Concerns <i>Dr. Jeffrey Voas, IEEE Reliability Society</i>
12:00-13:30	Lunch	
13:50-14:40	Chair: Prof. Yan-Fu Li Tsinghua University Beijing, China	Keynote Speech 4: Data-Driven Fault Detection in Distributed Large-Scale Processes <i>Professor Steven X. Ding, University of Duisburg-Essen</i>
14:40-15:30	Chair: Prof. Baoping Cai China University of Petroleum, China Qingdao, China	Keynote Speech 5: A New Diagnostic and Prognostic Tool for Machine Condition Monitoring, Canonical Variate Analysis <i>Professor David Mba, De Montfort University</i>
15:30-16:00	Tea Break	
16:00-16:50	Chair: Prof. Hu-Chen Liu Shanghai University Shanghai, China	Invited Talk: <i>Professor Liang Gao, Huazhong University of Science and Technology</i>
18:00	Conference Banquet	

October 26 [Saturday] 13:30-15:30

<div>Room</div> <div>Time</div>		Junior Ballroom (Second Floor)	Meeting Room 1 (Second Floor)	Meeting Room 2 (Second Floor)	Meeting Room 3 (Second Floor)	Meeting Room 4 (Second Floor)	Meeting Room 5 (Second Floor)
Session Topics		Panel 1 and Panel 3	Panel 2 and Panel 6	TS01: PHM for Energy Systems I	TS02: PHM for Energy Systems II	TS03: Battery Health Management	TS04: Reliability Modeling and Risk Analysis I
Oral Session A	13:30-13:45	Panel 1: PHM for Mechanical Systems Moderator: Prof. Siqi Qiu	Panel 2: Reliability Analysis of Multi-state Engineering Systems Moderator: Prof. Yi Ding Prof. Rui Peng	38	138	87	244
	13:45-14:00			45	161	107	299
	14:00-14:15			54	181	111	1
	14:15-14:30			77	192	194	11
	14:30-14:45	Panel 3: Degradation Modeling and Reliability Assessment Moderator: Prof. Yu Liu	Panel 6: Prognostics and Health Management for Advanced Industrial Systems Moderator: Prof. Yan-fu Li	46	199	269	81
	14:45-15:00			118	208	242	170
	15:00-15:15			123	221	254	214
	15:15-15:30			128	237	268	226
15:30-16:00		Tea Break					

October 26 [Saturday] 16:00-18:00

TIME TABLE

<div>Room</div> <div>Time</div>		Junior Ballroom (Second Floor)	Meeting Room 1(Second Floor)	Meeting Room 2(Second Floor)	Meeting Room 3(Second Floor)	Meeting Room 4(Second Floor)	Meeting Room 5(Second Floor)
Session Topics		TS05: Reliability Modeling and Risk Analysis II & Panel 4	TS06: Reliability, Maintainability and Supportability I & Panel 5	TS07: Reliability Maintainability, and Supportability II	TS08: Reliability, Maintainability, and Supportability III	SS12: PHM for Transportation	TS10: Data Driven Reliability Engineering I
Oral Session B	16:00-16:15	227	13	74	218	70	318
	16:15-16:30	262	20	102	228	147	5
	16:30-16:45	298	68	133	230	175	59
	16:45-17:00	Panel 4: Maintenance and system protection against internal failures and external impacts Moderators: Prof. Qingqing Zhai and Prof. Weiwen Peng	Panel 5: Reliability modelling and health management Moderators: Prof. Rui Peng and Prof. Xuejuan Liu	137	232	120	95
	17:00-17:15			139	256	141	185
	17:15-17:30			172	275	155	186
	17:30-17:45			167	303	103	188
	17:45-18:00			216	190	49	201
18:00		Conference Banquet					

October 27 [Sunday] 08:00-10:00

Time \ Room		Junior Ballroom (Second Floor)	Meeting Room 1 (Second Floor)	Meeting Room 2 (Second Floor)	Meeting Room 3 (Second Floor)	Meeting Room 4 (Second Floor)	Meeting Room 5 (Second Floor)
Session Topics		TS11: Data Driven Reliability Engineering II	TS12: Reliability Simulation, Prognostication, Optimization	TS13: Statistical analysis, Feature Extraction, Deep learning I	TS14: Statistical analysis, Feature Extraction, Deep learning II	TS15: Failure Physics, Material Science, Data Analysis, and Reliability Testing I	TS16: Failure Physics, Material Science, Data Analysis, and Reliability Testing II
Oral Session C	08:00-08:15	204	10	23	42	28	153
	08:15-08:30	220	316	50	121	36	177
	08:30-08:45	290	29	78	127	55	179
	08:45-09:00	314	34	75	122	3	24
	09:00-09:15	4	56	83	85	104	202
	09:15-09:30	6	63	84	148	136	236
	09:30-09:45	207	69	171	150	238	251
	09:45-10:00	8	88	183	160	253	260
	10:00-10:15	129	92	212	219	304	293
10:15-10:30		Tea Break					

October 27 [Sunday] 10:30-12:00

TIME TABLE

Time \ Room		Junior Ballroom (Second Floor)	Meeting Room 1 (Second Floor)	Meeting Room 2 (Second Floor)	Meeting Room 3 (Second Floor)	Meeting Room 4 (Second Floor)	Meeting Room 5 (Second Floor)
Session Topics		TS17: Development process planning, Lifecycle Design, Life Predictions I	TS18: Development process planning, Lifecycle Design, Life Predictions II	SS01: Fault Injecting and Modeling in PHM	SS02: PHM Based on Time Series Analysis	SS03: Safety and Reliability in Water Transport System	SS04: AI for PHM
Oral Session D	10:30-10:45	60	146	189	96	210	115
	10:45-11:00	252	240	79	97	279	187
	11:00-11:15	108	191	86	105	277	250
	11:15-11:30	125	272	94	124	145	174
	11:30-11:45	126	280	100	91	249	197
	11:45-12:00	313	297	140	288	259	211
12:00-13:30		Lunch					

October 27 [Sunday] 13:30-15:30

Room Time		Junior Ballroom (Second Floor)	Meeting Room 1 (Second Floor)	Meeting Room 2 (Second Floor)	Meeting Room 3 (Second Floor)	Meeting Room 4 (Second Floor)	Meeting Room 5 (Second Floor)
Session Topics		SS05: Fault Diagnosis, Prognosis, and Health Management for Aircraft Electrical System	SS06: PHM for Marine Equipment and Facilities	SS07: PHM for Gas Turbine Engines	SS08: Advanced Sensing, Data Fusion and Fault Diagnostics	SS09: PHM for Typical Mechanical Components I	SS10: PHM for Typical Mechanical Components II
Oral Session E	13:30-13:45	73	130	16	35	15	117
	13:45-14:00	164	200	39	62	19	278
	14:00-14:15	223	131	61	114	26	116
	14:15-14:30	151	213	149	43	27	134
	14:30-14:45	239	173	154	193	44	158
	14:45-15:00	308	270	215	142	47	165
	15:00-15:15	315	271	243	286	67	166
	15:15-15:30	317	52	274	71	80	178
	15:30-15:45	162	285	295	53	82	182
15:45-16:00		Tea Break					

October 27 [Sunday] 16:00-18:00

TIME TABLE

Time \ Room		Junior Ballroom (Second Floor)	Meeting Room 1 (Second Floor)	Meeting Room 2 (Second Floor)	Meeting Room 3 (Second Floor)	Meeting Room 4 (Second Floor)	Meeting Room 5 (Second Floor)
Session Topics		SS11: PHM for Typical Mechanical Components III	TS09: Complex system reliability modelling and analysis	SS13: Design and Integration of IVHM for Commercial Aircraft	SS14: Application of PHM in Aviation	TS19: Fault Diagnosis, Prognosis, Condition Monitoring and PHM	TS20: Maintenance and Warranty Management
Oral Session F	16:00-16:15	195	7	65	98	18	229
	16:15-16:30	203	169	76	281	22	101
	16:30-16:45	205	198	90	263	31	152
	16:45-17:00	89	255	37	264	40	257
	17:00-17:15	284	282	157	184	119	310
	17:15-17:30	307	289	159	206	48	319
	17:30-17:45	266	292	168	248	300	72
	17:45-18:00	51	305	176	14	163	180
18:00		Dinner					