



PHM Society- Education and Professional Development

Dialogue: Needs and Resources

Tuesday 1530-1715

Chair Jeff Bird

With Karl Reichard and Nancy Madge
PHM Society Education and Professional
Development Committee



Outline for the Dialogue

- PHM needs
- Dialogue Objectives and Speakers
- PHM Society Initiatives- Open Access Knowledge
 - PHM Taxonomy
 - Continuing Professional Development
 - Short Courses
- Panelist opinions and challenges
- Open discussion of key issues
- Way forward



PHM Needs

- 1) PHM is a diverse, multi-disciplinary domain with rapidly evolving capability needs.
- 2) Initial education and training from many disciplines must be complemented by specialized and professional development over a career.
- 3) Benchmarks are needed for career planners, employers and training developers to facilitate transitions between mastery levels.
- 4) Stakeholders in academia, industry and government want a stream of qualified practitioners.



Dialogue Objectives

- Identify PHM education and professional development (EPD) needs
- Identify PHM EPD resources
- Prioritize gaps and opportunities
- Panelists:
 - George Vachtsevanos (Georgia Tech)
 - Greg Kacprzyński (Sikorsky/Lockheed Martin)
 - Ravi Rajamani (drR2)
 - Kai Goebel (NASA)
 - Lachlan Astfalck (University of Western Australia)



PHM Taxonomy

Reference paper: <https://www.phmsociety.org/node/1152>

Domains

1. System physical modeling
2. Data Modeling
3. Analytics
4. Test and Experimental (Design and conduct)
5. Software Systems
6. Hardware Systems
7. Life Cycle Analysis
8. Verification and Validation
9. Human Factors
10. System Engineering
11. Cost Benefit Analysis
12. Certification
13. Standards

Capability

Specialty	Entry Level descriptors	Working Level descriptors	Mastery Level descriptors
Methods	Apply existing single and multi-disciplinary methods ...	Assess shortcomings in existing methods-adapt/hybridize methods to suit ...	Develop new methods from novel physics or mathematical insights ...
Metrics	Apply appropriate existing metrics ...	Adapt metrics to complex system evaluation ...	Devise and approve system level metrics ...



CPD: Activity Types?

Reference paper: <https://www.phmsociety.org/node/1535>

1. Professional Practice

- Analysis, planning, evaluation
- Internal report
- Influencing the practice of PHM

2. Formal Learning

- Organized courses, etc. as student or instructor
- Advanced certificates, degrees, theses or certification

3. Informal Learning- with summary of learning

- Self-directed learning
- Consultation with technical experts and peers
- Conference attendance
- Technical meeting attendance
- ‘Lunch and Learn’ activity attendee or leader

4. Contributions to Knowledge

- External/public codes, standards, papers, ...
- Conference paper reviewer, review manager
- Journal reviewer, associate editor, editor
- Technical program chair or committee
- Presentations- individual and panel
- PHM course developer

5. Participation

- Technical Conference management roles
- Technical Board or committee roles
- Mentoring as a mentor or mentee
- Community service

PHM Society Curriculum

- **Tutorials**
- **Doctoral Consortium**
- **Short Courses**
 - **Fundamentals**
 - **Data Analytics- Planned**
 - **Advanced courses?**



5-7 min. illuminations

Resources, Issues, Opportunities:

George Vachtsevanos (Georgia Tech)

Greg Kacprzyński (Sikorsky)

Ravi Rajamani (drR2)

Kai Goebel (NASA)

Lachlan Astfalck (University of Western Australia)



Issues?

1. Lifelong learning for PHM practitioners?
Raise awareness of PHM
Recognize needs and educate trends
2. Need a catalogue of CPD resources?
3. Targets for learning/training organizations?
Knowledge, hands-on, ...



Way forward

- Education Forum at:
www.phmsociety.org/forum/577
- PHM Short Course(s) with Continuing Education Units
- Form an action group to
 - Share contacts
 - Address gaps and opportunities
 - Finalize PHM Taxonomy and CPD scheme
 - ??