

Learning from the Experts Webinar Series

AI Applications in Offshore Wind Development and Operations



Serene Hamsho
President
Offshore Wind Academy

October 23, 2025

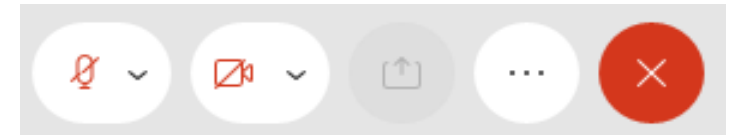
Meeting Procedures

Webinar recordings and presentations will be available at:

www.nyserda.ny.gov/osw-webinar-series

Participation for Members of the Public:

- > Members of the public will be muted upon entry.
- > Questions and comments may be submitted through the Slido Q&A feature at any time during the webinar.
- > If technical problems arise, please contact Sal.Graven@nyserda.ny.gov



You'll see  when your microphone is muted

Learning from the Experts

This webinar series is hosted by NYSERDA's offshore wind team and features experts in offshore wind technologies, development practices, and related research.

DISCLAIMER:

The views and opinions expressed in this presentation are those of the presenter and do not represent the views or opinions of NYSERDA or New York State.



NYSERDA



Application of AI in Offshore Wind

Serene Hamsho

President, Offshore Wind Academy

October 23, 2025



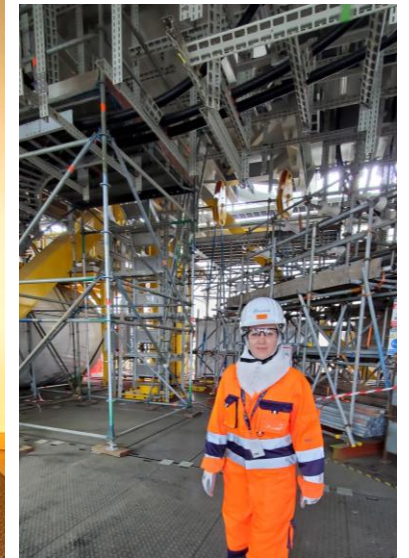
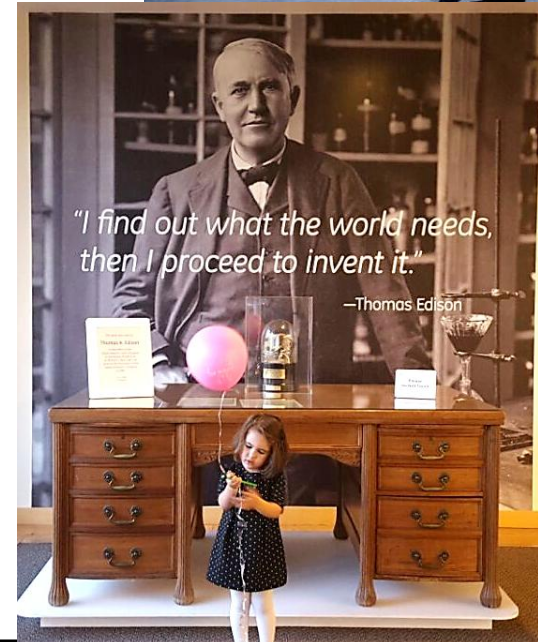
Agenda:

- 1. Introduction**
- 2. AI Fundamentals**
- 3. AI Across the Offshore Wind Lifecycle**
- 4. Future AI Opportunities**
- 5. Q&A and Discussion**



About me: Serene Hamsho

- Born in Syria.. Lived in France.. Based in Boston since 2012.
- Electronic Engineering, MA in Sustainable Development
- 15 years in the wind industry: onshore and offshore
- Currently leading the Offshore Wind Academy
- Prior experience:
 - Director of Technology and Innovation, Hexicon
 - Sr. Engineering Manager, Avangrid
 - Visiting Scientist, MIT
 - Sr. OSW Consultant, DNV
 - Wind Energy System Design Engineer, GE





115+
SME
Instructors

50+
Training
Courses

450+
Trained
Professionals

21+
Training
Partners

10+
Collaboration
Avenues

31+
Countries

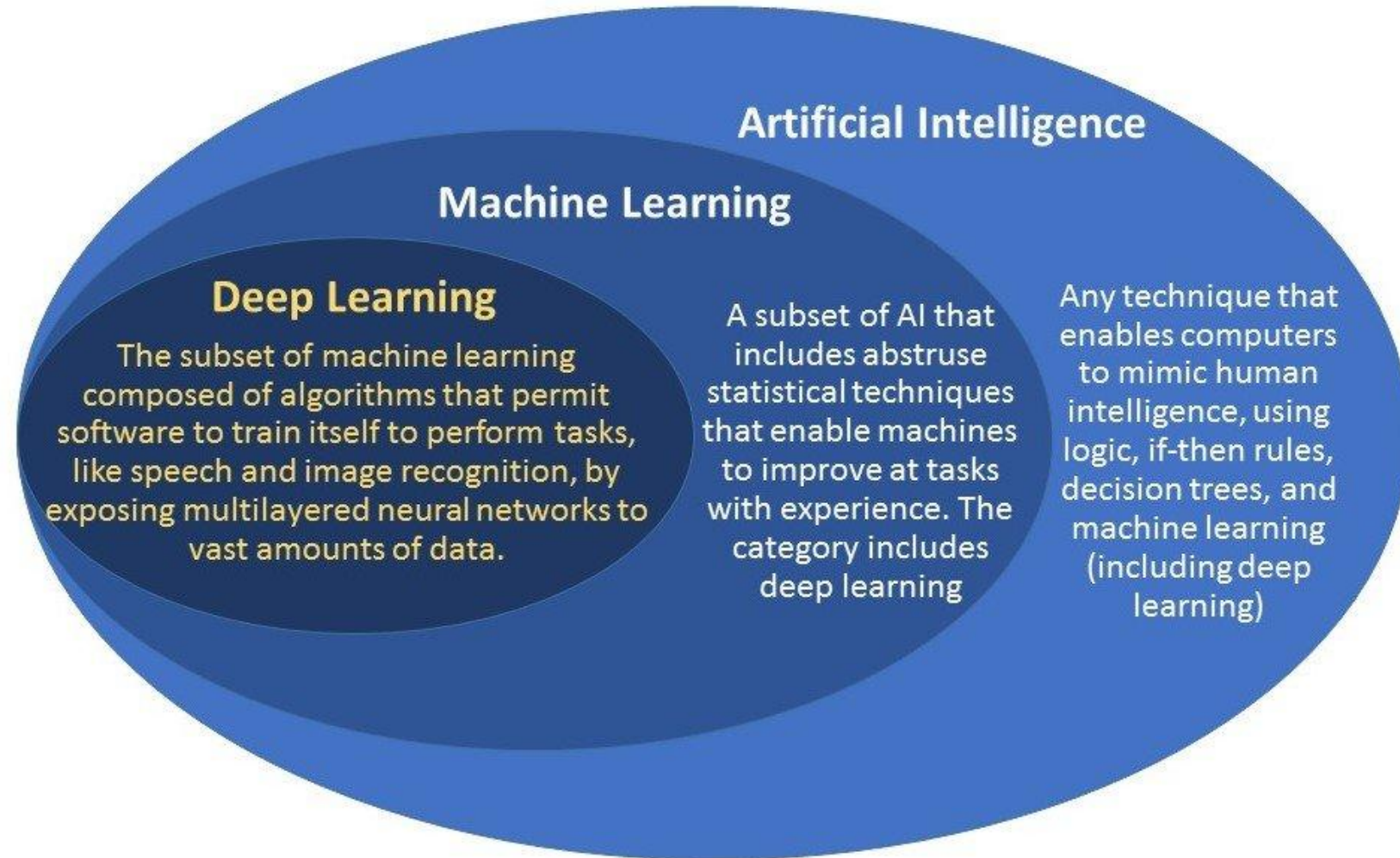
Why AI Matters for Offshore Wind

- Offshore wind is growing but remains largely manual.
- Meeting 2035/2050 targets needs digital acceleration.
- AI enables faster, data-driven decisions across the lifecycle.



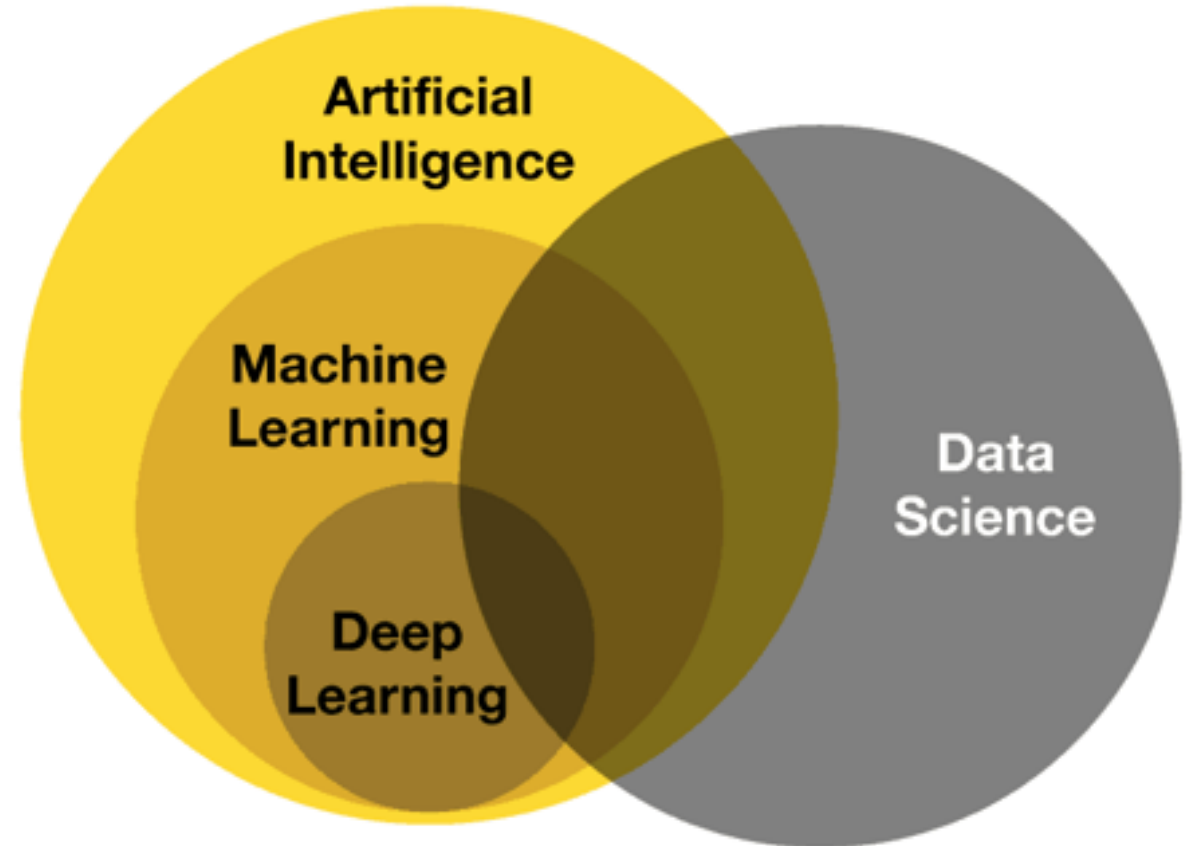
AI Fundamentals

- Artificial Intelligence → Human-like reasoning.
- Machine Learning → Learns from data.
- Deep Learning → Neural networks for pattern discovery.



AI Fundamentals

- Artificial Intelligence → Human-like reasoning.
- Machine Learning → Learns from data.
- Deep Learning → Neural networks for pattern discovery.
- Data Science → Combines coding, math, and domain expertise.



Offshore Wind Lifecycle & AI Touchpoints



Offshore Wind Project Timeline



- **Site selection:** AI evaluates seabed data, shipping routes, and wildlife zones.
- **Wind resource assessment:** AI correlates LIDAR and ERA5 datasets to predict long-term yield.
- **Construction:** Predictive logistics to coordinate vessels based on weather windows.
- **Operations & maintenance:** Computer vision detecting corrosion on monopiles.
- **Decommissioning:** AI models optimize turbine dismantling sequence and recycling plan.

AI in Site Selection & Development

- AI geospatial tools identify optimal lease zones.
- Integrates metocean, bathymetry, exclusion zones.
- AI software evaluate 100s of LCOE scenarios.
- Generative AI automates EIA reports and stakeholder summaries.



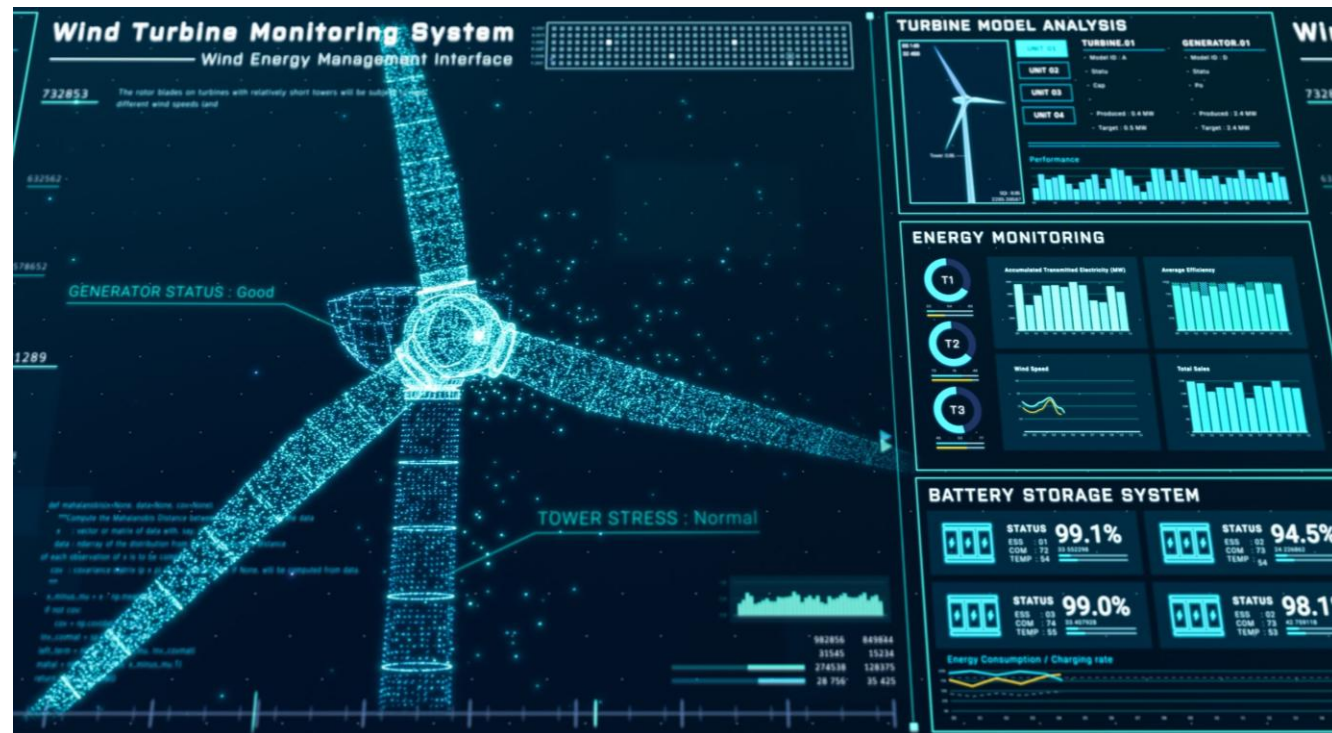
AI in Wind Resource Assessment

- ML improves wind prediction & wake modeling.
- BoxKite automates yield estimates in 60 seconds.
- CFD-ML (DNV) – neural network surrogate for CFD models.
- Generative AI advances global climate forecasting.
- Turbine interaction modeling



AI in Operations & Maintenance

- O&M = 30% of lifecycle cost.
- Predictive maintenance from SCADA & vibration data.
- AI Digital Twin predicts foundation fatigue.
- Drones & computer vision for autonomous inspection.
- Reinforcement learning for vessel & crew routing.

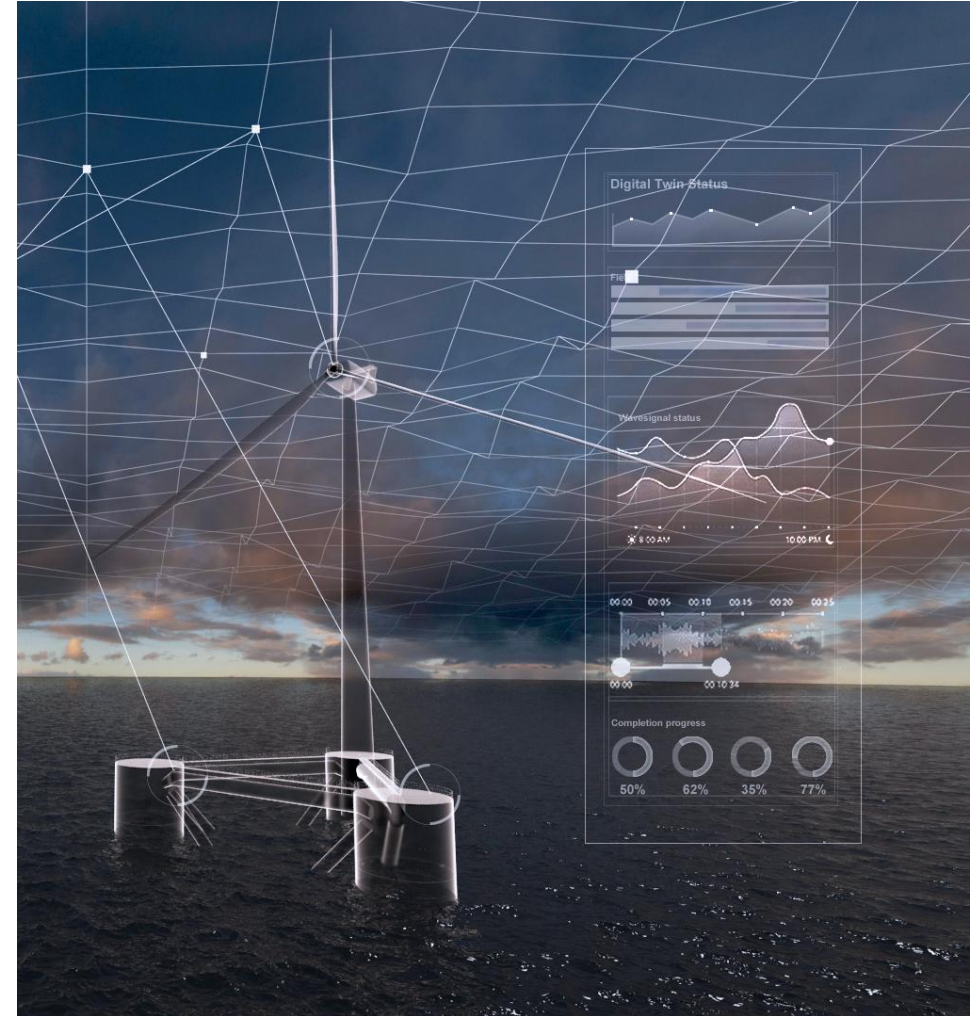


Case Studies

- **BitBloom:** Identifies turbine underperformance via temperature and power anomalies; increased yield by 2–4%.
- **Fugro & Ocean Infinity:** Operate AI-driven uncrewed vessels for offshore surveying—reducing carbon emissions by 90%.
- **PaleoScan:** Applies ML to interpret seismic layers for turbine foundation placement.
- **Arup SCALE:** Integrates environmental and economic datasets to automate site scoring.

Future AI Applications

1. Mooring line integrity monitoring (sensor fusion).
2. Generative AI for permitting & documentation.
3. Dynamic grid optimization for hybrid hubs.
4. Autonomous robotic inspections.
5. AI-enabled logistics & port operations.



Challenges & Enablers

- Challenges: fragmented data, lack of governance, skills gap.
- Enablers: open data, regulatory frameworks, cross-discipline teams.
- Tagline: “AI amplifies human judgment—it doesn’t replace it.”

Key Takeaways

- Digital twins + AI can extend turbine life by 5–10 years.
- Predictive analytics can reduce unplanned downtime by 30%.
- Data-driven maintenance lowers O&M costs by 10–15%.

AI won't replace human intelligence.. it will make our decisions faster, safer, and more sustainable.

Serene Hamsho

President, Offshore Wind Academy

Serene@aowacademy.com

www.offshorewind-academy.com



Next Webinar

November 19, 1:00 p.m. ET

Repurposing Offshore Expertise: Lessons Learned from Oil

James Bennett and Ian Voparil

Visit wind.ny.gov to register

Check out over 50 past webinars, including:

- Benthic Habitat Research for Offshore Wind
- Adopting New Technologies – Offshore Wind Around the World
- Emerging International Markets for Offshore Wind
- How Offshore Wind Contributes to Domestic Energy Security
- Navigational Safety and Offshore Wind

www.nyserda.ny.gov/osw-webinar-series

We want your feedback! Fill out the “Learning from the Experts” survey at wind.ny.gov.