

## **Topics and Areas of Interest for the Hydro Fellowship Program**

Topics and areas of interest for the Hydro Fellowship Program include, but are not limited to, the following:

### **Environmental and Societal**

- Adaptation to Climate Change and Variability/Extreme Events
- Endangered Species Protection and Management of Invasive Species
- Aquatic Habitat and Environmental Flow Requirements
- Fish Passage and Protection of Migratory Species
- Water Quality Management and Mitigation
- Reservoir Emissions of Greenhouse Gases
- Shoreline and Land Management/Recreation
- Tools for Environmental Optimization
- Resolution of Conflicts with Tribal/Indigenous Peoples Perspectives
- Sedimentation and Erosion Control

### **Equipment and Technology**

- Environmentally Compatible Oils and Lubricants
- Simulation and Optimization Models for Machine and Operational Improvements
- Advances in Generators, Transformers, and Electrical Systems
- Instrumentation and Controls (Protection, Automation, Governors, SCADA)
- Predictive Maintenance/Repair and Condition Monitoring
- Planning and Strategies for Rehabilitation and Efficiency and Capacity Improvements
- Advanced Turbines for Energy and Environmental Performance
- Advanced Material Applications
- Improvements in Pumps, Pump-Turbines, and Related Technologies

### **Market Trends and Strategies**

- Economics of Pumped Storage Projects
- Innovations for Small Hydro Development
- Renewable Energy Integration Strategies (Hydro and Non-Hydro)
- Market Structure Effects on Ancillary Benefits
- Distributed Energy Opportunities
- Pricing and Cost-Recovery of Generation Products
- Certification and Verification of Green Energy (RECs, etc.)

### **Project Management and Operations**

- Maximizing Ancillary Benefits
- Costs and Impacts of Dam Removal and Decommissioning

- Modifying Hydro Operations in Response to Climate Change
- Performance Testing and Improved Flow Measurement
- Power System Stability and Reliability
- Equipment Failure Forensics and Root-Cause Analysis
- Risk Assessment, Risk Management, and Optimizing Financial Investments
- Hydro and Pumped-Hydro Benefits to Transmission Systems
- Operational Costs to Hydro of Supporting Intermittent Renewables
- Methods for Knowledge Capture and Transfer in Workforce Transitions
- Human Factors in Operations and Incidents

### **Water Management Innovations**

- Basin-Wide Planning and Modeling for Decision-Making
- Multi-Use Systems Including Off-Channel Water Storage
- Structural and Geotechnical Aspects of Dam Safety
- Flood and Drought Management in a Changing Climate
- Forecasting of Precipitation, Runoff, and Storage
- Innovations in Water Conveyances (Canals, Controls, Gates, Penstocks, Spillways, Valves, Coatings)