SUMMARY OF ACTIVITIES IN 1981

IOWA INSTITUTE OF HYDRAULIC RESEARCH
THE UNIVERSITY OF IOWA
IOWA CITY, IOWA

February 1982
JOURNAL ARTICLES


Summary of Activities, 1981


PAPERS PUBLISHED IN CONFERENCE PROCEEDINGS


PAPERS PRESENTED AT CONFERENCES


3. Kennedy, J.F., Opening Address, XIXth Congress International Association for Hydraulic Research, New Delhi, India, 1-5 February.


5. Landweber, L., "Irrotational Flow Within the Boundary Layer and Wake", The Fourth Weinblum Memorial Lecture, Institut für Schiffbau, University of Hamburg, 18 November.


DISCUSSIONS


BOOK REVIEWS


BULLETINS

(none)

NEW BOOKS AUTHORED BY INSTITUTE STAFF


OTHER


**PH.D. THESES ACCEPTED**


**M.S. THESES ACCEPTED**


**M.S. WITHOUT THESIS**

Tembhekar, Shekhar, (adviser: S.C. Jain).
<table>
<thead>
<tr>
<th>Name</th>
<th>Employment Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baban, Farzad</td>
<td>Graduate Research Assistant</td>
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<td>Baek, Je-Hyun</td>
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<td>Chandrasekhara, Muguru S.</td>
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<td>Chen, Hamn-Ching</td>
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<td>Chen, Wenchung</td>
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<td>Cheng, Ching-Hong</td>
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<tr>
<td>Cherian, Mookuncheril</td>
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<td>Callado, Jaime</td>
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<td>Cook, Alfred</td>
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<td>Craig, William O.</td>
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<td>Dinavahi, Surya Prasad</td>
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<td>Dlubac, James J.</td>
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<td>Feng, Wei-Fang</td>
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<td>Hatfield, Kirk</td>
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<td>Ho, Kuo-San</td>
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<td>Hsu, Chung-Chieh</td>
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<td>Ju, Sangsone</td>
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<td>Kadle, Durgaprasad S.</td>
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<td>Karim, Fazle</td>
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<td>Krishan, Dharmvir</td>
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<td>Lee, Yong-Yuan</td>
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<td>Liu, Ming</td>
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<td>Matos-Silva, Jose</td>
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<td>Menendez, Angel</td>
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<td>Munukutla, Sastry S.</td>
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<td>Prasad, K.L. Krishna</td>
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<td>Robison, C. Price</td>
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<td>Shahshahan, Ali</td>
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<td>Shie, Kuo-Fu</td>
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<td>Singh, Kanwerdip</td>
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<td>Srinivasan, Ponniahpillai</td>
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<td>Tang, Chii-Jau</td>
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<td>Tembhekar, Shekhar</td>
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<td>Tu, Shuen-Wei</td>
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<tr>
<td>Urroz-Aguirre, Gilberto E.</td>
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<tr>
<td>Vomvoris, Efstratios G.</td>
<td>Graduate Research Assistant</td>
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<tr>
<td>Vadnal, John L.</td>
<td>Graduate Research Assistant</td>
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</tbody>
</table>

* Started employment at IIHR in 1981
** Terminated employment at IIHR in 1981
<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>Wang, Keh-Han</td>
<td>Graduate Research Assistant</td>
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<td>Wasimi, Saleh A.</td>
<td>Graduate Research Assistant</td>
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<td>* Yoo, Sungyul</td>
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<td>Zaphirakos, Alexander</td>
<td>Graduate Research Assistant</td>
</tr>
</tbody>
</table>
IIHR SENIOR STAFF

* Aguirre-Pe, Julian, Visiting Research Scientist
* Chen, Ching-Jen, Professor, Research Engineer
* Chwang, Allen T., Professor, Research Engineer
* Cramer, James, Instrumentation and Computer Engineer
* Deng, Yu-Shu, Visiting Research Engineer
* Ettema, Robert, Visiting Assistant Research Scientist
* Giaquinta, Arthur R., Adjunct Assistant Professor, Associate Research Scientist
* Harris, Dale C., Assistant Director for Operations
* Hong, Rou-Jai, Visiting Research Engineer
* Howe, Joseph, Professor Emeritus
* Jain, Subhash C., Associate Professor, Research Engineer
* Janssen, Marlene, Administrative Assistant
* Kennedy, John F., Carver Professor, Director
* Kitanidis, Peter K., Assistant Professor, Research Engineer
* Krogstad, Per-Aage, Visiting Assistant Professor and Research Scientist
* Landweber, Louis, Professor, Research Engineer
* Li, Wei, Visiting Research Engineer
* Macagno, Enzo O., Professor, Research Engineer
* McDonald, Donald B., Professor, Research Engineer
* Mori, Kazahiro, Visiting Research Scientist
* Mueller, Andreas, Visiting Associate Professor
* Nakata, Tatsuaki, Adjunct Assistant Professor, Research Scientist
* Odgaard, A. Jacob, Assistant Professor, Research Engineer
* Patel, Virendra C., Professor, Research Engineer
* Prabhau, Aradhya, Visiting Research Scientist
* Ramapriyan, Belakavadi, Associate Professor, Research Engineer
* Schnoor, Jerald, Associate Professor, Research Engineer
* Tatenoiaux, Jean-Claude, Associate Professor, Research Engineer
* Yassin, Alaa, Visiting Research Scientist

* Started employment at IIHR in 1981
** Terminated employment at IIHR in 1981
### SUMMARY OF ACTIVITIES IN 1981

**IOWA INSTITUTE OF HYDRAULIC RESEARCH**  
**THE UNIVERSITY OF IOWA**  
**IOWA CITY, IOWA**  
**February 1982**

#### SPONSORED RESEARCH PROJECTS ACTIVE IN 1981

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<th>Study Subject</th>
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<th>Investigator(s)</th>
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<tr>
<td><strong>Research and Engineering Apprenticeship Program</strong></td>
<td>AAS</td>
<td>Ramaprian</td>
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<tr>
<td>* Hydraulic modelling of circulating water intake structure at Midland Plant Units 1 and 2</td>
<td>BI</td>
<td>Jain, Kennedy</td>
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<td><strong>Testing of Apeco Air-Vacuum valve</strong></td>
<td>BI</td>
<td>Odgaard</td>
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<tr>
<td><strong>Hydrothermal model study of intake-discharge system for Korea Electric Company's Nuclear Units 5 and 6</strong></td>
<td>BI</td>
<td>Odgaard, Kennedy</td>
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<td><strong>Model study of proposed sediment through cleaning system of Jeffry Energy Center</strong></td>
<td>BV</td>
<td>Ettema</td>
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<tr>
<td>Field testing of cooling water discharge system, Quad Cities Nuclear Plant</td>
<td>CECO</td>
<td>Odgaard</td>
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<td>* Design and physical hydraulic modelling of drop-shaft configurations for the Inline Storage System for the city of Milwaukee Water Pollution Control</td>
<td>CH²MH</td>
<td>Kennedy, Jain, Nakato, Odgaard, Ettema</td>
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<tr>
<td><strong>Seismic response of three-dimensional dam-reservoir systems</strong></td>
<td>CIT/NSF</td>
<td>Chwang</td>
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<tr>
<td>Review applicability of HEC-6 scour deposition model to bed degradation in the Missouri River from Gavins Point Dam downstream to Omaha, Nebraska</td>
<td>COE(OD)</td>
<td>Kennedy</td>
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<tr>
<td><strong>Coralville Reservoir water quality studies</strong></td>
<td>COE(RI)</td>
<td>McDonald</td>
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</tbody>
</table>

* Research projects initiated in 1981  
** Research projects completed in 1981
* Review and evaluate computer-simulation studies and structural alternatives to reduce dredging
  COE(RI) Nakato

* Develop improved sediment budget for the Upper Mississippi River GREAT-II reach
  COE(RI) Nakato

Analysis of Sacramento River bend flow characteristics
  COE(SD) Odgaard

* Refinement and verification of predictive models of suspended sediment and toxic desorption and dispersion for Mississippi River GREAT-III Reach
  COE(SL) Schnoor, Giaquinta, McDonald

An investigation of some fundamental engineering aspects of frazil ice
  CRREL Kennedy, Ettema

Convective and radiative transfer for turbulent flow in energy systems
  DOE Chen, Smith

*** Model testing of plume-recirculation characteristics of the cooling tower of Matimba Power Station, South Africa
  HPI Jain, Kennedy

*** Field measurements to obtain diagnostic data on river flow and shoaling in the vicinity of Duane Arnold Energy Center make-up water intake
  IELP Ettema

** Effects of power plant cooling on Iowa Reservoirs
  IPALCO Jain, Kitanidis, Kennedy

*** Evaluate the hydroelectric potential of Red Rock Dam
  IPALCO Kitanidis

** Des Moines River Reservoir Operating Strategies
  ISWRRI Kitanidis

** Toxic substances models for the Upper Mississippi and Missouri Rivers
  ISWRRI Giaquinta, Schnoor

* Analysis of hydrodynamic computer models for flow and sediment routing in flood prediction
  NAS Nakato, Kennedy

Development of finite analytic method for internal computational fluid mechanics
  NASA Chen

* Research projects initiated in 1981
** Research projects completed in 1981
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* Large-scale mixing in developing wakes in developing wakes behind streamlined bodies
  NASA Ramaprian

** Experimental study of trailing-edge and near-wake flows
  NASA Ramaprian, Patel

** Segmentation pumping in the small intestine
  NIH Macagno, Christensen

Pulsatile flow dynamics of prosthetic heart valves
  NIH Chen, Chandran

Drag forces on slender spheroids at low Reynolds numbers
  NSF Chwang

* Nonlinear hydrodynamic pressures of dams during earthquakes
  NSF Chwang

* Characteristic times and rates of non-equilibrium river processes
  NSF Jain, Kennedy

* The formation and mechanical properties of naturally occurring ice systems within the context of civil engineering interests
  NSF Kennedy

* Identification of hydrogeologic parameters employed in regional groundwater models
  NSF Kitanidis

Further experiments on two-dimensional buoyant jets
  NSF Ramaprian

** Design and construction of refrigerated tank-flume for research on ice engineering problems
  NSF Tatinclaux,

** Four problems in ice engineering
  NSF Tatinclaux, Kennedy

** Effect of boundary layer on thrust deduction
  NSRDC Landweber

* Viscous effect on ship wave resistance
  NSRDC Landweber, Mori

Viscous flow over ship sterns
  NSRDC Patel, Prabhu, Krogstad, Mori

Ship hydrodynamics
  ONR Landweber

* Further research in ship hydrodynamics
  ONR Landweber

* Research projects initiated in 1981
** Research projects completed in 1981
Icebreaking resistance of ships

** Model study of East Bend Station Unit No. 2 cooling tower bypass system

*** Model study of Miami Fort cooling tower basin and bypass system

** Model study of plume behavior for the boiler stack of Vienna Unit No. 6

* Analytical and physical modelling of causeway and ice-control structures for City of Nome Port/Dock facility

Three-dimensional turbulent boundary layer on a body of revolution at incidence

An experimental investigation of unsteady, turbulent boundary layers

*** Cost-effective sampling strategies for the Missouri River

Incorporation of river bend characteristics and effects into mathematical model of alluvial rivers

List of Abbreviations

<table>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AAS</td>
<td>American Academy of Science</td>
</tr>
<tr>
<td>BI</td>
<td>Bechtel, Incorporated</td>
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<tr>
<td>BV</td>
<td>Black and Veatch Engineers</td>
</tr>
<tr>
<td>CECo</td>
<td>Commonwealth Edison Company</td>
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<tr>
<td>CH²MH</td>
<td>CH²M Hill Engineers</td>
</tr>
<tr>
<td>CIT</td>
<td>California Institute of Technology</td>
</tr>
<tr>
<td>COE(OD)</td>
<td>U.S. Army Corps of Engineers, Omaha District</td>
</tr>
<tr>
<td>COE(RI)</td>
<td>U.S. Army Corps of Engineers, Rock Island District</td>
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<tr>
<td>COE(SD)</td>
<td>U.S. Army Corps of Engineers, Sacramento District</td>
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<tr>
<td>COE(SL)</td>
<td>U.S. Army Corps of Engineers, St. Louis District</td>
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<tr>
<td>CRREL</td>
<td>U.S. Army Cold Regions Research and Engineering Laboratory</td>
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<tr>
<td>DOE</td>
<td>U.S. Department of Energy</td>
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<tr>
<td>HPI</td>
<td>Hudson Products, Inc.</td>
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<tr>
<td>IELP</td>
<td>Iowa Electric Light and Power Company</td>
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<td>IPALCO</td>
<td>Iowa Power and Light Company</td>
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<table>
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<tr>
<th>Acronym</th>
<th>Full Name</th>
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<tbody>
<tr>
<td>ISWRRI</td>
<td>Iowa State Water Resources Research Institute</td>
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<td>NAS</td>
<td>National Academy of Science</td>
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<td>NASA</td>
<td>National Aeronautics and Space Administration</td>
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<td>NIH</td>
<td>National Institute of Health</td>
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<td>NSF</td>
<td>National Science Foundation</td>
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<td>NSRDC</td>
<td>Naval Ship Research and Development Center</td>
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<td>ONR</td>
<td>Office of Naval Research</td>
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<td>SL</td>
<td>Sargent and Lundy Engineers</td>
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<td>SM</td>
<td>State of Maryland</td>
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<td>TAMS</td>
<td>Tippetts, McCarthy, Abbott, and Stratton Engineers</td>
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<td>TMC</td>
<td>The Marley Company</td>
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<td>USAFOSR</td>
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<td>USARO</td>
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<td>USGS</td>
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