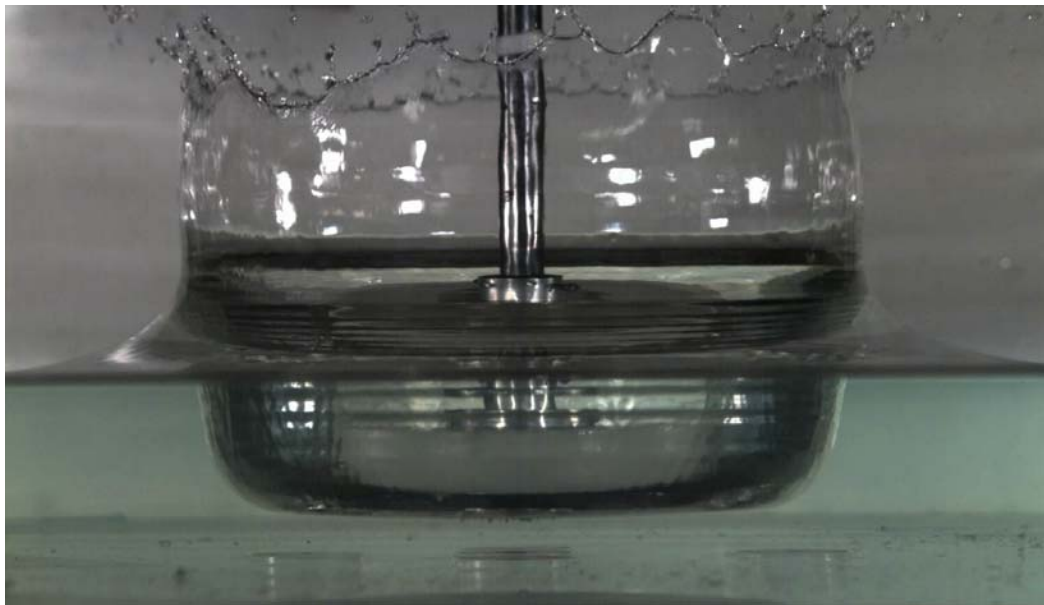


24th International Workshop on Water Waves and Floating Bodies

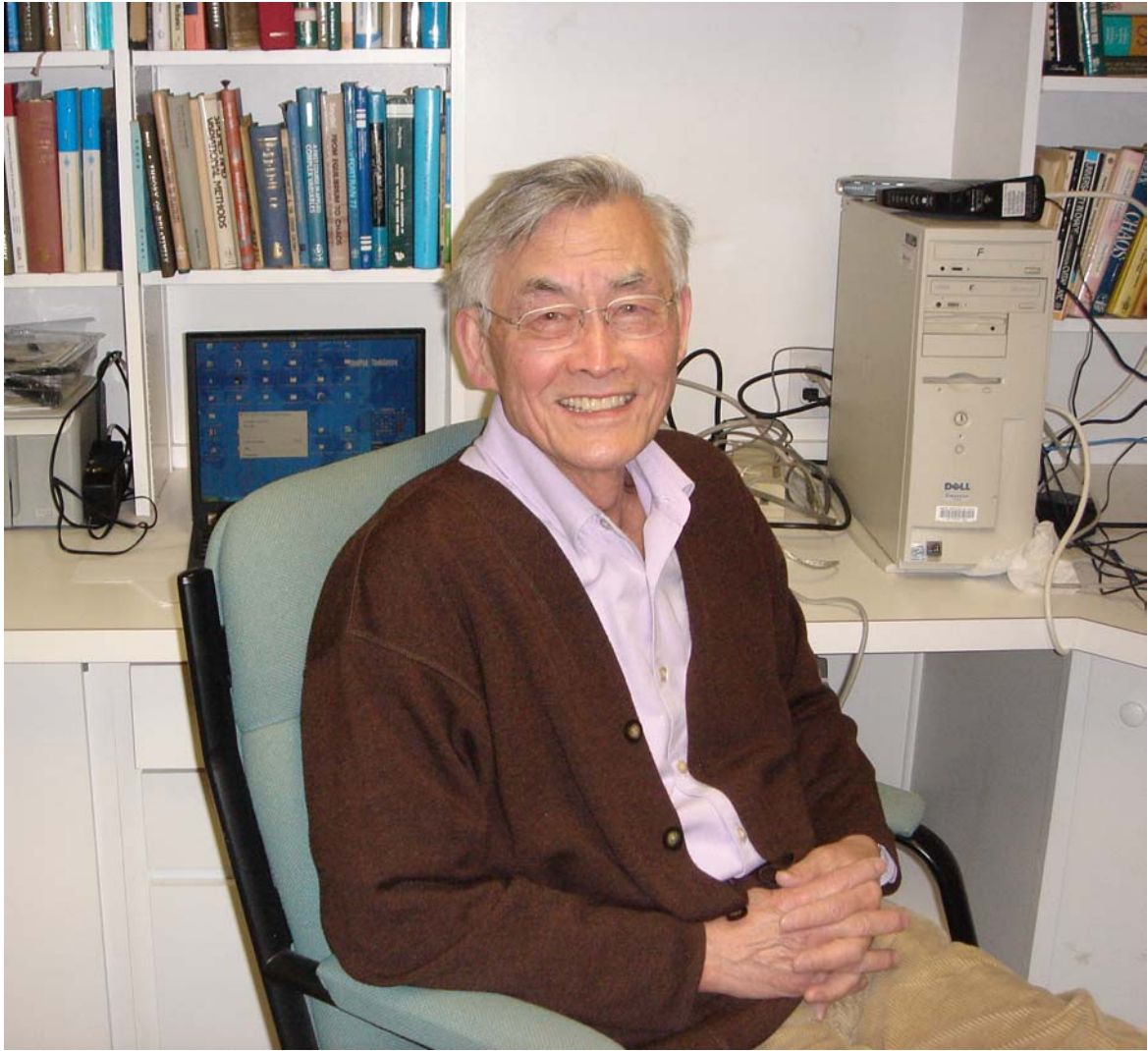
Proceedings



19 – 22 April 2009, Zelenogorsk, Russia



Editors:
Pavel Plotnikov and Alexander Korobkin



Professor Chiang C. Mei

Foreword

The International Workshop on Water Waves and Floating Bodies is an annual meeting of engineers and scientists with special interests in water waves and the effects of waves on floating or submerged bodies. The workshop was initiated over twenty years ago by Professor Nick Newman from MIT and Professor David Evans from Bristol University. Since its inception, the workshop has grown from strength to strength. It annually brings together marine hydrodynamicists, naval architects, offshore and arctic engineers and other scientists and mathematicians, from industry and academia, to discuss current research and practical problems in a focused week of activity. Attendance is restricted to the authors of submitted extended abstracts that are reviewed for acceptance by the Programme Committee. These proceedings include the extended abstract for every presentation made at the 24th workshop. The proceedings of previous workshops are available online at www.iwwwfb.org.

The 24th International Workshop on Water Waves and Floating Bodies is dedicated to Professor Chiang C. Mei (MIT). Professor Mei is internationally recognized as one of the most outstanding researchers and educators in fluid mechanics, with applications to civil, environmental and coastal engineering. He has made significant contributions to the theory of coastal and ocean dynamics.

Acknowledgements

The 24th IWWFBB was organized by the Lavrentyev Institute of Hydrodynamics (Novosibirsk, Russia), the University of East Anglia (Norwich, UK) with important help from the Institute of Problems of Mechanical Engineering of the Russian Academy of Sciences (St. Petersburg, Russia). The Workshop was jointly sponsored by the Office of Naval Research Global, Bureau Veritas, the Russian Foundation for Basic Research, and the Krylov Shipbuilding Research Institute. All support is gratefully acknowledged.

“Monomax” is acknowledged for hosting and taking care of local organization.

Photo for the title page was provided kindly by Prof. E.V. Ermanyuk.

A Note for the CC Mei Celebration

by N. Newman

Chiang Mei, affectionately known to his friends and colleagues as ‘CC’, will retire this year after a distinguished career of 44 years at MIT. The formality of retirement is not likely to affect his activities, but it is an appropriate occasion to recall how much he has contributed to the broad field of applied mechanics and especially to the area of interest represented by the Workshop.

After receiving his first degrees at the National University of Taiwan and Stanford, CC worked with Ted Wu at CalTech and received his PhD in 1963. In 1965 he joined the Faculty in the Department of Civil Engineering at MIT, where he has dedicated himself tirelessly to the multitudinous tasks of a Professor. He has mentored students from all over the world, some of whom have come to this Workshop to celebrate his career. CC has produced an impressive list of research papers, two important books, and co-authored a third. He has been recognized with prestigious titles, duties, and memberships: Ford Professor of Engineering at MIT, Associate Editor of the Journal of Fluid Mechanics, Member of the National Academy of Engineering, Academician of Academia Senica in Taiwan, and Guggenheim Fellow. He has received visiting appointments, prizes and awards from many organizations in the US, UK, Norway, France, Taiwan, Singapore, China and Australia.

Both the range and depth of CC’s work are remarkable. His broad expertise is evident in his second book, ‘Mathematical analysis in engineering’ which introduces methods of applied mathematics to engineers in a stimulating manner. This followed his treatise on ‘The applied dynamics of ocean surface waves,’ one of the most important books in our field. His research covers many topics in continuum mechanics including viscous and stratified flows, sediment diffusion, acoustic radiation and diffraction, porous media, soil mechanics, waves in elastic media, and problems involving combinations of these phenomena. Within the special domain of the Workshop he has worked on topics including wave interactions with bodies, sloping beaches, hybrid finite-element methods, applications of the method of multiple scales, wave-energy conversion, shallow-water waves, nonlinear waves, waves over bathymetry, Bragg scattering, trapping and resonance. One of his brilliant applications was to explain the role of subharmonic resonance in the rows of hinged barriers used to protect Venice from floods.

CC and his wife Carol have often entertained students and colleagues at their home, where the intellectual and gastronomic rewards were memorable. On one occasion about thirty years ago CC proudly showed us his new TRS-80 home computer. Ernie Tuck, who was present that evening, quickly bought one, and CC deserves some credit for the computations which followed from Tuck’s home in Adelaide. For many of us it was the first indication that a home computer could be used for serious research. On another occasion when several of us were together in Trondheim, CC took it upon himself to prepare an elaborate dinner in his somewhat sparse lodgings. While we were enjoying the main course and admiring his culinary skill, he confessed that he had received instructions from Carol in an expensive trans-Atlantic telephone call.

We are delighted to welcome CC and Carol to the 24th Workshop, and to have this opportunity to celebrate his extraordinary career.

To Chiang and Carol Mei, from your lucky students

To you CC, my advisor and mentor, I owe more than words can describe for everything I have learned from you about being a teacher and researcher. Studying under you, you've taught me everything I know about perturbation methods and wave hydromechanics. Yet, like all great teachers, you taught not so much by speech but by your example and your accomplishments. From these, I learned valuable things that have fundamentally impacted me and have become a part of me as an educator and researcher. I learned from you about tireless dedication and perseverance; the satisfaction of accomplishing something worthwhile even and perhaps especially if it is difficult. I learned from you, CC, the respect for truth; the joy of discovery; the beauty of a great idea or a neat result. I learned from you the importance of integrity and honesty and humility in seeking knowledge. These and so much more I learned from you, CC, as your student, and as your colleague, even to this day. I offer as a salute to you, CC a quote from the great American author and historian Henry Adams: "A teacher affects eternity; he can never tell where his influence stops." Thank you, CC, for being such as teacher!!

You were a truly inspirational role model as a scholar as well as a teacher. Everybody knows your exceptional scholarly achievement. But, you were also an exceptional teacher/supervisor. Because of you I became convinced that training a new generation of scholars is as important as being a good scholar myself, and I decided to pursue my career combining teaching & research (rather than in research only).

Your family, particularly Carol, was so warm and helpful for the students. You invited the students in many occasions such as Thanksgiving dinners. Those from foreign countries (like me) really appreciated such opportunities. For me, your family was the first American family I got to know.

You've had very many students, men and women, from all over the world. At any given time, a number of us would be working in very different fields. You found the time and the patience to guide each one according to her/his individual needs meeting us on our own ground (and yes, you were a feminist long before it became politically correct). We used to wonder: A student is supposed to work harder than his teacher, yet you worked eight days a week. You mastered the balance between challenge and support, required to let us, your students (which you referred to as "associates") to develop as independent scholars. You provided intellectual, financial and emotional support, in your special delicate and sensitive manner.

We didn't need awards to realize what a teacher you are, but the consensus is clearly discernable:

Conspicuously Effective Teaching Award, 1972

Conspicuously Effective Teaching Award, 1984

Graduate Student Council Department Teaching Award, 1984

Teaching Hall of Fame Award, 1990 (that one was awarded when the pattern got boring).

You are a gifted teacher, endowed with the insight and the patience required to deliver your lucid message to diverse audiences. You are much more than a teacher, you are an educator. The great Confucius may have had you in mind when saying:

"A superior man is modest in his speech, but exceeds in his actions."

*On behalf of all your students we thank you,
Chiang and Carol (we know that it was a joint effort),
for everything.*

Committees and Responsible Organizations

Prof. Pavel Plotnikov – co-chairman, Corresponding Member of RAS (LIH)

Prof. Alexander Korobkin – co-chairman (UEA)

Dr. Tatiana Khabahpasheva – vice-chairman (LIH)

Program committee

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Dr. Emilian Parau (UEA)

LIH – Lavrentyev Institute of Hydrodynamics, Siberian Branch of RAS,
Novosibirsk, Russia

IPME – Institute of Problems of Mechanical Engineering of the Russian
Academy of Sciences, St. Petersburg, Russia

UEA – University of East Anglia, Norwich, UK



Programme

Sunday 19th April 2009

8.0.8.50 Breakfast
 9.00-10.00 Registration
 10.00-12.00 Excursion around Zelenogorsk
 12.00-13.00 Registration
 13.00-14.00 Lunch

14.00-14.25 *Introduction, welcome*

Session 1 – Chair: Y. Kim

14.25-14.50 **Grue, J.** Modifications to the interfacial wave field moving over variable bottom topography in three dimensions
 14.50-15.15 **Bulatov, V.V., Vladimirov, Yu.V.** Non-harmonic internal gravity wave packets in stratified media
 15.15-15.40 **Khabakhpasheva, T.I., Korobkin A.A.** Compressible jet impact on corrugated plate
 15.40-16.00 Coffee Break

Session 2 – Chair: W.Y. Duan

16.00-16.25 **Eatoock Taylor, R., Taylor, P.H., Drake, K.R.** Tank wall reflections in transient testing
 16.25-16.50 **Molin, B., Lecuyer, B., Remy, F.** Hydrodynamic modeling of partial dikes
 16.50-17.15 **Farley, F.J.M., Chaplin, J.R., Hearn, G.E., Rainey, R.C.T.** Persistent modes for water waves and a bulge tube in a narrow channel

17.15-17.30 Coffee Break

Session 3 – Chair: J. Grue

17.30-17.55 **Delhommeau, G., Noblesse, F., Yang, C.** Highly simplified Green function for steady flow about a ship
 17.55-18.20 **Chen, X.B., Lu, D.Q.** Time-harmonic ship waves with the effect of surface tension and fluid viscosity
 18.20-18.45 **Greco, M., Bouscasse, B., Colicchio, G., Lugni, C.** Weakly-nonlinear seakeeping model: regular/irregular wave interaction with a ship without/with forward speed

19.00 *Welcome party*

Monday 20th April 2009

8.00-8.50 Breakfast

Session 4 – Chair: J.N. Newman

- 8.50-9.15 *Faltinsen, O.M., Timokha, A.* Analytically-based solutions for linear sloshing
9.15-9.40 *Lin, F., Ge, C., Li, E.* Computation of sloshing loads by velocity potential analysis and CFD modeling
9.40-10.05 *Kulczycki, T., Kuznetsov, N.* High spots of the free surface for the fundamental sloshing mode

10.05-10.20 Coffee Break

Session 5 – Chair: E. Campana

- 10.20-10.45 *Abrahamsen, B.C., Faltinsen, O.M.* Decay of air cavity slamming pressure oscillations during sloshing at high fillings
10.45-11.10 *Iafrati, A.* Air entrainment and degassing process in breaking waves
11.10-11.35 *Afanasiev, K., Rein, T.* Numerical simulation of the dam break problem by general natural element method

11.35-11.50 Coffee Break

Session 6 – Chair: O.M. Faltinsen

- 11.50-12.15 *Yoon, B.S., Semenov, Y.A.* Flow separation at the initial stage of the oblique water entry of a wedge
12.15-12.40 *Xu, G.D., Duan, W.Y., Wu, G.X.* Time domain simulation of water entry of twin wedges through free fall motion
12.40-13.05 *Halbout, S., Malleron, N., Remy, F., Scolan, Y.-M.* Impact of inflated structures on a liquid free surface

13.05-14.00 Lunch

Session 7 – Chair: T.I. Khabakhpasheva

- 14.00-14.25 *Meylan, M.H., Tomic, M.* Resonances and the approximation of wave forcing for elastic floating bodies
14.25-14.50 *Bennetts, L.G., Williams, T.D., Squire, V.A.* An approximation to wave scattering by an ice polynya
14.50-15.15 *Bonnefoy, F., Meylan, M., Ferrant, P.* Non-linear higher order spectral solution of a moving load on a floating ice sheet
15.15-15.40 *Sturova, I.V.* Nonlinear hydroelasticity of a plate floating on shallow water of variable depth

15.40-16.00 Coffee Break

Session 8 – Chair: X.B. Chen

- 16.00-16.25 *Checherin, I., Pustoshny, A.* On the estimation of wash effect of ship waves system
16.25-16.50 *Westphalen, J., Greaves, D., Williams, C., Drake, K., Taylor, P.* Numerical simulation of an oscillating cone at the water surface using computational fluid dynamics
16.50-17.15 *Ermanyuk, E.V., Gavrilov, N.V., Kostomakha, V.A.* Impact of a circular disk with flat, concave and convex bottom on shallow water
17.15-17.40 *Colicchio, G., Greco, M., Miozzi, M., Lugni, C.* Experimental and numerical investigation of the water-entry and water-exit of a circular cylinder

17.50 Meeting of the Workshop Committee

19.00 Dinner

Tuesday 21st April 2009

8.00-8.50 Breakfast

Session 9 – Chair: N.G. Kuznetsov

- 8.50-9.15 **Dobrokhoto**, *S.* Complete and explicit asymptotics of solutions to the linearized shallow water equations generated by localized perturbations
- 9.15-9.40 **Porter**, *R.*, **Evans**, *D.V.* Estimation of wall effects on floating cylinders
- 9.40-10.05 **Voisin**, *B.* Added mass for wave motion in density-stratified fluids

10.05-10.20 Coffee Break

Session 10 – Chair: I.V. Sturova

- 10.20-10.45 **Andronov** *A.N.* On the stability of bifurcating solutions in some problems about capillary-gravity waves
- 10.45-11.10 **Evans**, *D.V.*, **Peter**, *M.A.* Reflection of water waves by a submerged horizontal porous plate
- 11.10-11.35 **Motygin**, *O.V.*, **McIver**, *P.* Trapping of gravity-capillary water waves by submerged obstacles

11.35-11.50 Coffee Break

Session 11 – Chair: B. Molin

- 11.50-12.15 **Kim**, *Y.*, **Kim**, *K.H.*, **Kim**, *Y.H.* Linear and nonlinear springing analyses in time domain using a fully coupled BEM-FEM
- 12.15-12.40 **Malenica**, *S.*, **Molin**, *B.*, **Tuitman**, *J.T.*, **Bigot**, *F.*, **Senjanovic**, *I.* Some aspects of hydrostatic restoring for elastic bodies
- 12.40-13.05 **Ten**, *I.*, **Korobkin**, *A.* Interaction of elastic structure with non-uniformly aerated fluid

13.05 – 14.00 Lunch

Session 12 – Chair: T.Hara

- 14.00-14.25 **Ferreira**, *M.D.*, **Newman**, *J.N.* Diffraction effects and ship motions on an artificial seabed
- 14.25-14.50 **Avni**, *R.*, **Toledo**, *Y.*, **Agnon**, *Y.* Linear and nonlinear complementary mild slope equations
- 14.50-15.15 **Aubault**, *A.*, **Yeung**, *R.W.* Multi-hull interference wave-resistance in finite-depth waters
- 15.15-15.40 **Noblesse**, *F.*, **Delhommeau**, *G.*, **Yang**, *C.* Bow waves of a family of fine ruled ship hulls with rake and flare
- 15.40-16.05 **Alam**, *M.-R.*, **Mei**, *C.C.* Ships advancing near the critical speed in a shallow channel with a randomly uneven bed

16.05-16.35 Coffee Break

Session 13 – Chair: R.W. Yeung

- 16.35-17.00 **Hara**, *T.*, **Kukulka**, *T.* Wave spectrum and breaking wave statistics of growing and mature seas
- 17.00-17.25 **Oh**, *S.H.*, **Kwon**, *S.H.*, **Chung**, *J.Y.* A close look at air pocket evolution in flat impact
- 17.25-17.50 **Joncquez**, *S.A.G.*, **Bingham**, *H.B.*, **Andersen**, *P.* A comparison of methods for computing the added resistance of ships using a high-order BEM
- 17.50-18.15 **Zhao**, *B.B.*, **Duan**, *W.Y.*, **Chen**, *X.B.*, **Webster**, *W.C.* Tsunamis simulations by using Green-Naghdi theory

19.00 Banquet

Wednesday 22nd April 2009

8.00-8.50 Breakfast

Session 14 – Chair: D.V. Evans

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|-------------|---|
| 9.15-9.40 | <i>Kimmoun, O., Scolan, Y.-M.</i> Generation of focalized wave packet |
| 9.40-10.05 | <i>Duan, W.Y., Zhang, T.Y.</i> Non-reflecting simulation for fully-nonlinear irregular wave radiation |
| 10.05-10.30 | <i>Dingemans, M.W., Klopman, G.</i> Effects of normalisation and mild-slope approximation on wave reflection by bathymetry in a Hamiltonian wave model |

10.30-10.50 Coffee Break

Session 15 – Chair: R. Eatock Taylor

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|-------------|---|
| 10.50-11.15 | <i>Chatjigeorgiou, I.K., Mavrakos, S.A.</i> Hydrodynamic diffraction by multiple elliptical cylinders |
| 11.15-11.40 | <i>Engsig-Karup, A.P., Bingham, H.B.</i> Boundary-fitted solutions for 3D nonlinear water wave-structure interaction |
| 11.40-12.05 | <i>Teng, B., Gou, Y.</i> A time-domain model of internal wave diffraction from a 3D body in a two-layer fluid |
| 12.05-12.30 | <i>Peter, M.A., Meylan, M.H.</i> Water-wave scattering by vast fields of bodies such as ice floes in the Marginal Ice Zone |
| 12.30 | Closing Workshop |

13.00-14.00 Lunch

14.00 Tour to the Krylov Shipbuilding Institute

Transfers to the airport and Saint- Petersburg