CONFERENCE GUIDE

INTERCOH2021

13-17 September 2021 - Delft, The Netherlands

TU Delft · UNESCO IHE DELFT · Deltares

Contents

Welcome to Delft!

Gainesville 1981: A group of scientists was invited by Ashish Mehta to bring scientists together who work on fine sediments. This was the period when computer models were introduced, without cell phones or internet. A travel agency was needed to book a flight. They easily managed with wired telephones, faxes and normal mail.

Istanbul 2019: At the end of a successful Intercoh, we proposed to organise the 16th Intercoh in Delft. This was the time that we were shaking hands, we could be packed in the cosy restaurants of Istanbul, we did not have to worry about the number of people in a room, and we hugged goodbye to meet two years later.

Delft 2021: COVID, COVID, COVID. It changed our lives, our way of working, the way of meeting, the way of travelling. It made distances larger, but also smaller. We got used to meetings behind screens. We realised that it is not always needed to travel. We are still finding a balance.

What stayed is that we are still puzzled and surprised by the dynamics of fine sediments. Problems related to fine sediments are as big as in the past. Future problems arise. So, more than enough reasons to bring scientists together and discuss the recent progress in fine sediment dynamics! That's what we aim to do this week.

Yes, we are with a limited number of participants in Delft, but we have the biggest online participation we ever had in Intercoh history. We cannot meet everyone in person, but we open up possibilities that were closed before.

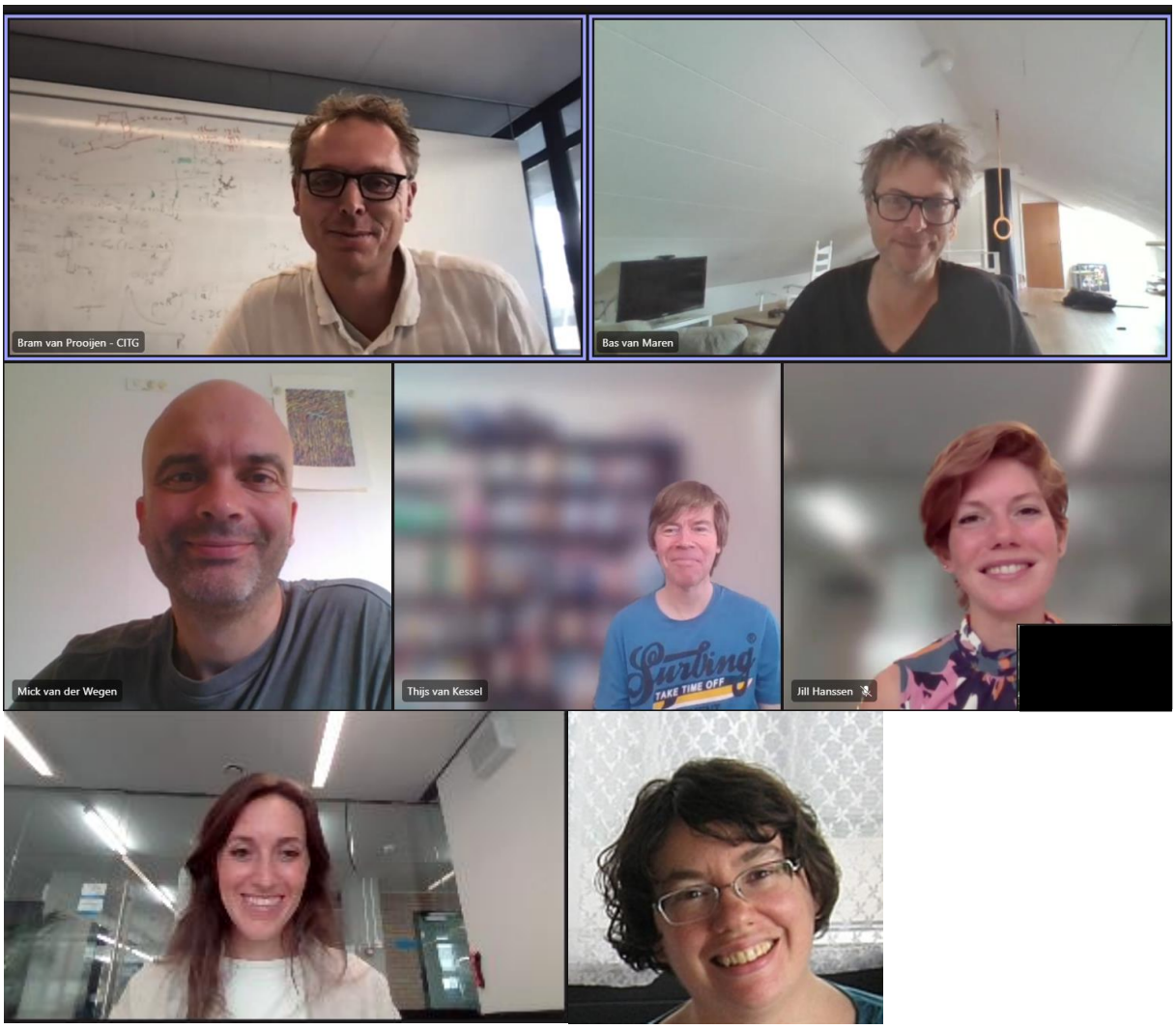
Independent on global politics or virus spreading, with technological developments in our advantage, we hope you will enjoy this 16th Intercoh. We scheduled enthusiastic young researchers who present their work for the first time, enthusiastic seasoned researchers eager to share their latest ideas, discussion sessions about human interventions and flocculation, small talk or heated disagreements during coffee breaks. We hope that this Intercoh will be as inspiring as the ones before!

The organizing committee,

Ana, Jill, Claire, Mick, Thijs, Bas and Bram

The organizing committee

The Delft institutes TU Delft, Deltares, and IHE have a long tradition in research on water and sediment and we have a long tradition of collaboration. We therefore continued this collaboration for the organization of Intercoh 2021.



1. Bram van Prooijen (TU Delft)
2. Bas van Maren (Deltares)
3. Mick van der Wegen (IHE Delft)
4. Thijs van Kessel (Deltares)
5. Jill Hanssen (TU Delft)
6. Ana Colina Alonso (TU Delft)
7. Claire Chassagne (TU Delft)

Scientific Program

Monday 13 September	
9:30-10:15	**Registration and Coffee in X,** Mekelweg 8 
10:15-10:30	**Welcome and start of the conference**
10:30-12:00	**Estuarine Sediment Transport Models (Chair: Susana Vinzon)** Skillfull hindcast of a decade of mud-morphodynamics in South San Francisco Bay salt pond restoration. ***M. van der Wegen****, J. Reyns, B. Röbke, J. Nam, J. Lovering, A. Foxgrover, B. Jaffe* Assessing the long term variability of suspended particulate matter from the tributaries of a large coastal lagoon. ***E. C. Bortolin****, J. Távora, E.H. Fernandes* Understanding the spatio-temporal variability of SPM dynamics from observations and model analysis. ***T. van Kessel****, M. Fettweis, R. Verney* Feedback effects of sediment suspension on estuarine turbidity maximum. ***C. Zhu****, D.S. van Maren, L. Guo, J. Lin, Q. He, Z.B. Wang* Uncovering the sediment transport processes that caused the regime shift to hyperturbid conditions in the Loire Estuary. ***Y.M. Dijkstra****, R.J.A. de Goede* Modeling the rheological behavior of high-concentrated mud suspensions in the Ems Estuary: why a yield stress model should be avoided. ***J. Schmidt****, A. Malcherek, M. Naulin*

12:00-13:30	**Lunch**
13:30-15:00	**Characterizing Sediments and Suspensions (Chair: Florent Grasso)** A numerical study of the flow of fluid mud in a cylinder and vane rheometer. ***D.S.Ch.Praveen****, Erik A. Toorman* Characterizing the Composition of Suspended Sand and Mud Suspensions in Coastal Environments using Combined Optical and Acoustic Measurements : Laboratory Experiments. ***Duc Tran****, Stuart Pearson, Matthias Jacquet, Bram Van Prooijen, Romaric Verney* Turbulent-laminar transitions in flows laden with Cohesive sediment. ***M.G.W. de Vet****, R. Fernández, J.H. Baas, W.D. McCaffrey, R.M. Dorrell* Characterizing the Composition of Sand and Mud Suspensions in Coastal Environments using Combined Optical and Acoustic Measurements: Field Applications. ***S.G. Pearson****, R. Verney, H.C.M. Hendricks, D. Tran, M. Jacquet, Z.B. Wang, B.C. v. Prooijen* High Resolution Echosounder Data from Water Surface to Sea Bed. ***M. Daugharty****, J. Brinkkemper, S. Kamminga, H. Huitema, J. Van Heesen, S. Nylund* Acoustic measurements of cohesive sediments suspensions, the role of flocculation and sand. ***Francisco Pedocchi****, Rodrigo Mosquera*
15:00-15:30	**Coffee break**
15:30-16:30	**Interactions with biology (Chair: Melanie Diaz)** A bio-morphodynamic modelling study to determine how environmental conditions control mangrove vulnerability to sea-level rise. ***Danghan Xie****, Christian Schwarz, Maarten G. Kleinhans, Barend van Maanen* Intra-annual surface elevation dynamics in a mangrove forest in New Zealand. ***R. Gijsman****, E.M. Horstman, A. Swales, C.A. Eager, I.T. MacDonald, T.J. Bouma, K.M. Wijnberg* Can the Demak Mangrove-Mud Coast Keep up With Relative Sea Level Rise? ***B.P. Smit****s, B.K. Van Wesenbeeck, M.A.de Lucas Pardo, D.S. Van Maren* Key bioturbator species within benthic communities determine sediment resuspension thresholds. ***J.C. de Smit****, M.Z.M. Brückner, K. Mesdag, M.G. Kleinhans, T.J. Bouma*
16:30-17:00	Keynote presentation Peter Herman. **Can I borrow your mud? On men, plants, beasts and mud in a changing coast.**
17:00-	**Icebreaker**

Tuesday 14 September	
8:30-10:00	**High Turbidities (Thijs van Kessel)** Analytical Approach for Channel Formation in Hyperconcentrated Flows. ***A.M. Talmon*** Consolidation and desiccation of mud deposits: numerical modelling. ***E. Meshkati****, G. Dupuits, P.J. Vardon, T. van Kessel, A. Talmon, J. Tigchelaar, L. Sittoni, W.R.L. van der Star* Dynamic fluid mud layer on intertidal mudflat. ***Q. Zhu*** Dynamic Response of the Fluid Mud to a Tropical Storm. ***Jianzhong Ge****, Changsheng Chen, Zheng Bing Wang, Pingxing Ding* Fluid mud in dune troughs: The mud-dune transition in coastal plain estuaries. ***Marius Becker*** Managing a high range turbid system at a tidal energy site: - Severn Estuary, UK. ***R Kirby****, C Retière*
10:00-10:30	**Coffee break**
10:30-11:30	**Poster session** Behavior of mud aggregates at the Socheongcho Ocean Research Station (SORS) in the eastern Yellow Sea. *G. Lee,S.M. Figueroa, J. Chang* The role of biophysical stickiness on oil contaminated mineral flocculation in seawater. *L. Ye, A. J. Manning, J. Holyoke, J. A. Penaloza-Giraldo, T.-J. Hsu* Study of spectral wave dissipation at the Hendijan mud coast, the Persian Gulf. *M.R. Kiani, M. Soltanpour, S.A. Haghshenas* Sediment stability and EPS interactions in intertidal habitats. *J.M. Rounce, A.J. Manning, J.A. Hope, A.J. Blight, D.M. Paterson* Distribution and Transport of Micro/Nano Plastics with Chemical Contaminants & Biological Agents in Industrial, Urban and Rural Aquatic Environments. *A. Burch, A. Manning*

	On satellite remote sensing reflectance resolutions and the implications to the assessment of Suspended Particulate Matter: study case of Patos Lagoon, Brazil. *J. Tavora, E. C. Bortolin, E. H. Fernandes* An investigation of sonar techniques past and present to identify objects on and beneath the seabed. *T.D. Maw, A.J. Manning* Spring-neap variability of tidal current velocity in the Emder Fairway (Ems Estuary) derived from moored ADCP. *Anna Wünsche, Marius Becker, Christian Maushake, Christian Winter* Issues relating to the disposal of muddy dredged material – A global perspective. *T.J. Peters, A.J. Manning* Flocs Behaviour in Fluvial to Marine Transition: A Laboratory Study. *E. Abolfazli, R. Osborn, K.B.J. Dunne, J.A. Nittrouer, K. Strom*
11:30-12:00	**Geotechnics (Chair: Arno Talmon)** Geotechnical properties and constitutive model parameters of deep-sea sediment from the Western Mediterranean Sea. ***P. Kaminski**, J. Grabe, M. Urlaub, T. Sager* Toe scour at a vertical wall on a vegetated silt beach. ***Z. Peng**, Q. He, X.Y. Wang*
12:00	**Announcements**
12:00-13:30	**Lunch**
13:30-15:00	**Field observations (Isabelle Brenon)** Sediment dynamics at an estuary mouth: detrending the impact of tides, river discharge and waves from high-frequency measurements. ***R. Verney**, F. Grasso, C. Gaillard* How are fines buried in a sandy seabed? ***H.C.M. Hendriks**, B.C. v. Prooijen, C.H. Cheng, S.G.J. Aarninkhof, J.C. Winterwerp, K.E. Soetaert* Reworking of cohesive turbiditic deposits in the Cassidaigne submarine canyon by internal and regional currents. ***R. Silva Jacinto**, B. Dennielou, I. Pairaud, P. Garreau* Feedback loops arising from sand-mud interaction cause bimodal mud contents. ***A. Colina Alonso**, D. S. van Maren, P.M.J. Herman, R. J. A. van Weerdenburg, Y. Huismans, Z. B. Wang* Regime shifts in sediment concentrations in the Changjiang Estuary. ***J. Lin**, B.C. v. Prooijen, L. Guo, C. Zhu, Q. He, Z.B. Wang* Evaluation of the Krone-Partheniades Model: Using Field Observations to Estimate Erosion and Deposition Fluxes. ***Zaiyang Zhou**, D.S. van Maren, Jianzhong Ge, Pingxing Ding, Zheng Bing Wang*

15:00-15:30	**Coffee break**
15:30-16:00	**Dredging (Chair: Bas van Maren)** Working with nature - investigating agitation dredging as a methodology for sediment recycling in a small estuary system with a large port. ***J. Spearman****, T. Benson, J. Taylor* Mid-term effects of maintenance dredging in the physical functioning of the Seine Estuary. ***J.P. Lemoine****, F. Grasso, B. Mengual, P. Le Hir*
16:00-16:30	**Keynote presentation Edward Anthony** ***Muddy coasts and human impacts from a perspective on the world's river deltas***
16:30-18:00	**Discussion on human interferences in muddy coasts**

Wednesday 15 September	
8:30-10:00	**Ports and Approach Channels (Chair: Joris Vanlede)** The forgotten ones from the ports: The filter feeders at the heart of siltation processes. ***V. Hamani****, I. Brenon, T. Coulombier, J.R. Huguet, L. Murillo* Experimental studies on the sedimentation and consolidation behaviour of fluid mud in the port of Hamburg. ***D. M. Nguyen****, J. Grabe, N. Ohle, U. Schmekel* Investigating Sedimentation in Bushehr Port Access Channel, Adopting Periodic Sonar Surveys and Numerical Simulations. *A. Farhangmehr, S****. A. Haghshenas****, E. Zarinfar* Siltation processes of dredged navigation channel at estuarine port. ***Y. Nakagawa****, T. Kosako, T. Watanabe* Spatial variability in the yield stress of mud at Port of Hamburg, Germany. ***A. Shakeel****, A. Kirichek, C. Chassagne* Detailled modelling and monitoring of WID as an efficient harbor siltation maintenance strategy. ***L. de Wit****, K. Cronin, A. Kirichek, T. van Kessel*
10:00-10:30	**Coffee break**
10:30-11:30	**Poster session** Wall-slip artefact signature in rheometry of natural fluid muds. *A.M. Talmon, E. Meshkati, A.P.K. Goda, A. Kirichek* Response of the turbidity maximum zone to fluctuations in sediment deposition in the Wouri estuary. *Y. Fossi Fotsi, I. Brenon, R. Onguene, N. Pouvreau, J. Etame* When does suspended mud deposit on a relatively immobile substrate? *T. Ashley, K. Strom, J. Schieber, Z. Yawar* Dynamics of sand-mud mixtures in the Khuran Starit – the Persian Gulf*M. Hajibaba, M. Soltanpour, S.A. Haghshenas, A. Farhangmehr* A 1DV-model for submerged density currents. *H.C.M. Hendriks, T. van Kessel, T. Vijverberg, A.J. Nobel, I. Doets, M.D. Klein, L. Sittoni, R. Uittenbogaard, J.C. Winterwerp*

	Estimation on equilibrium mudflat profiles at the mouth of the Shirakawa River using the principle of maximum information entropy. *G.Tsujimoto, R. Yukimura, T.Hokamura, R.Yamaguchi* Carbon Accretion in the Sediments of Estuarine Mangroves in Sri Lanka. *Ahalya Suresh, Jinsoon Park, Jong Song Khim* Flocculation in estuaries: modelling, laboratory and in-situ studies. *C. Chassagne, Zeinab Safar, Zhirui Deng, Qing He, A. Manning* DEXMES: A novel cylindrical device for SPM experiments. *D. Tran, A. Bocher, M. Jacquet, S. Pearson, F. Floc'h, N Le Dantec, F. Dorval, G. Fromant, A. Vergne, F. Jourdin, A. Crave, H. Lintanf, R. Verney* Mud profile equations and evaluation. *A. Perwira, Mulia Tarigan, Hasanul Arifin Purba*
11:30-12:00	**Numerical model development (Chair: Lynyrd de Wit)** Dynamic sediment flocculation: Development of a 2DH model for coastal applications. ***Sebastian Escobar Ramos**, Qilong Bi, Samor Wongsoredjo, Erik Toorman* A sensitivity study of residual transport using a 1DV model. ***J. Vanlede***
12:00	**Announcements**
12:00-13:30	**Lunch**
13:30-15:00	**Flocculation (Chair: Han Winterwerp)** Flocculation influenced by the presence of algae in the Changjiang Estuary. ***Z. Deng**, C. Chassagne, Q. He, Z.B. Wang* The characteristics of the organic matter in biomineral flocs. ***M. Fettweis**, M. Schartau, X. Desmit, N. Terseleer, B.J. Lee, D. Van der Zande, R. Riethmüller* Flocculation dynamics in estuarine channel and shallows. ***R.M. Allen**, D.N. Livsey, and J.R. Lacy* A quantitative examination of floc structure considering turbulence, salinity and sediment concentration. ***C. Guo**, A.J. Manning, S. Bass, L. Guo, Q. He* Long term flocculation of kaolin clay in the absence of gravity. *B. Vowinckel, P. Luzzatto-Fegiz, N. Rommelfanger, **F. Kleischmann**, E. Meiburg*
15:00-15:30	**Coffee break**
15:30-17:00	**Estuaries and Tidal Flats (Chair: Mick van der Wegen)**

	Lateral sediment exchange mechanisms in the Ems estuary. ***D. S. van Maren**, J. Vroom, J. van Keulen* Dynamics of suspended particulate matter properties in the Maroni estuary. ***M. Chapalain**, G. Detandt, K.A. Do, A. Gardel, N. Huybrechts, T. Maury, A. Sottolichio* Near bed cohesive sediment dynamics in Montevideo bay. ***Rodrigo Mosquera**, Francisco Pedocchi* The Sediment Flux in Salt marsh Tidal channel systems. ***J. Sun**, B.C. v. Prooijen, X.Wang, Q.He, Z.Wang* Intertidal mudflats can (not) survive sea level rise. ***F. Grasso**, B. Mengual, P. Le Hir, and J.-P. Lemoine* What defines the tidal flat shape? ***Jill Hanssen**, Bram van Prooijen, Peter Herman*
17:00-18:00	**Mehta Award Presentation**

Thursday 16 September	
8:30-10:00	**Large-scale sediment dynamics (Chair: Ricardo Silva Jacinto)** Anthropogenic effects on regime shifts in the Yangtze Estuary. ***Q. He****, C. Zhu, J. Lin, L. Zhu, Y. Chen, Z.B. Wang, and J.C. Winterwerp* Numerical modeling of suspended sediment fluxes between a macrotidal estuary and its adjacent shelf: horizontal and vertical structures. ***Melanie Diaz****, Florent Grasso, Aldo Sottolichio, Pierre Le Hir, Benedicte Thouvenin, Mathieu Caillaud* Internal tides as a major process in Amazon continental shelf fine sediment transport. ***E. Molinas****, J. C. Carneiro, S.B. Vinzon* Mud dynamics and the morphodynamic response of the Western Scheldt estuary to sea level rise. ***H. Elmilady****, B. Röbke, M. van der Wegen, D. Roelvink, A. van der Spek, M. Taal* Spring-neap variations in sediment trapping in tide-dominated estuaries: the role of the bottom pool. ***H.M. Schuttelaars****, D.D. Bouwman, Y.M. Dijkstra* Understanding multi-year and seasonal variations in SPM in the Dutch Wadden Sea using a Delft3D-FM numerical model. ***R.J.A. van Weerdenburg****, J. Vroom, B.P. Smits, T. van Kessel, P.M.J. Herman*
10:00-10:30	**Coffee break**
10:30-11:30	**Poster session** Sediments dynamics in a closed macrotidal estuary (Rance estuary, France): from mud to a mixture of mud-sand-gravel. *R. Rtimi, A. Sottolichio, P. Tassi* The origin of two-step yielding in natural mud: wall slip or structural reorganization? *A. Shakeel, A. Kirichek, C. Chassagne* Mangroves direct hydrodynamics and morphology in Whitianga Estuary, New Zealand. *A. Rahdarian, K.R. Bryan, M. van der Wegen* Numerical simulation of hydrodynamics for morphological study around river mouth in north western Java Island, Indonesia. *T. Kosako, H. Tamura, A. Bagyo Widagdo, D. C. Istiyanto, Y. Nakagawa* Sediment dispersion of low-density clayey suspension turbidity currents generated by deep-sea mining. *D. Enthoven, C. Chassagne, R.L.J. Helmons, J.L.J. Hanssen*

	Field measurements and lab investigations to determine soil exchange characteristics for sediments from the Weser estuary. *J. Patzke, E. Nehlsen, P. Fröhle, R. Hesse, A. Zorndt* Erosion rate formula of very fine sediment bed based on turbulent entrainment. *Harada D., Egashira S.* Experimental and numerical study of a cylinder passing through fluidized natural mud. *Marco S. Sotelo, Djahida Boucetta, Bart Brouwers, Guillaume Delefortrie*
11:30-12:00	**Microplastics (Chair: Romaric Verney)** A systematic study on the interaction between microplastics and cohesive sediments. ***Nan Wu**, Kate L. Spencer, Stuart W. D. Grieve, Andrew J. Manning* Flocculation of microplastic and natural sediment at environmentally realistic concentrations. ***T.J. Andersen**, S. Rominikan, I.D. Olsen, K.H. Skinnebach, N.Z. Grube, S. Jedal, S.N. Laursen, M. Fruergaard*
12:00	**Announcements**
12:00-13:30	**Lunch**
13:30-15:00	**Flocculation (Chair: Michael Fettweis)** The monitoring of flow mechanics in cohesive sediment layers. ***B. Brouwers** E. Lataire and J. v. Beeck* Modelling of Deep Sea Mining-Generated plumes. ***M.F.A.I. Elerian**, Z. Huang, C. van Rhee, R.L.J. Helmons* Examining erosional and depositional characteristics in cohesive sediment: Flocculation and microplastics in an estuary. ***J.M. Rounce**, L. Anscomb, L. Farrington, C. Flint, E. Saunders, A.J. Manning* Flocculation study with the help of a model based on logistic growth theory. ***W. Ali**, C. Chassagne* Cohesive Sediment Fluxes in a Muddy Tidal Channel Highly Impacted by Humans. ***S.M. Figueroa**, G. Lee, J. Chang* Influence of riverine suspended sediment organic matter on particle size distribution. ***D. Sehgal**, N. Martínez-Carreras, C. Hissler, V.F. Bense, A.J.F. Hoitink*
15:00-15:30	**Coffee break**
15:30-16:00	**Flocculation (Chair: Erik Toorman)** Vertical distributions of mud floc sizes in two reaches of the lowermost Mississippi River. *Ryan Osborn, **Kyle Strom**, Kieran Dunne, Jeffrey A. Nittrouer, and Tom Ashley*

	Estuarine light attenuation, scattering, and absorption as a function of suspended floc properties and other water column constitutents. ***C.T. Friedrichs**, K.A. Fall, G.M. Massey*
16:00-16:30	**Keynote lecture by Kate Spencer**
16:30-18:00	**Discussion on future developments in flocculation research**
18:00	**Announcement of the Krone Award**
19:30-	**Conference dinner**

Friday 17 September

9:00-17:00

Excursion:
Water and sediment in Holland over the last centuries.

9:00 Leave Delft (hotel Hampshire Hotel)

10:00 Arrival at Museum Gouda, exibition Koele Wateren (Cool Waters) with paintings from the Amsterdam Rijksmuseum and Gouda's history of living with water

11:30 Visit to the church of Gouda with its stained glasses

12:30 Lunch at the Stroopwafel bakery "Van der Berg"

14:00 Guided tour through Gouda

15:30 Free time to explore Gouda

17:00 Departure to Delft

17:30 Arrival in Delft

Event details

General

All updates and additional information during Intercoh will be published on the website https://www.intercoh2021.org/

Zoom: During the conference we will use the application Zoom to connect the online and onsite attendees. You can download zoom for free at https://zoom.us/download

Make sure you have the latest version of Zoom installed (5.7.7.). This will allow you to make use of all options.

You will receive a new zoom link to attend the conference every day.

Important: The poster sessions will be online. This means that also attendees in Delft must bring their laptop to join the poster sessions.

Onsite part in Delft

How to get there

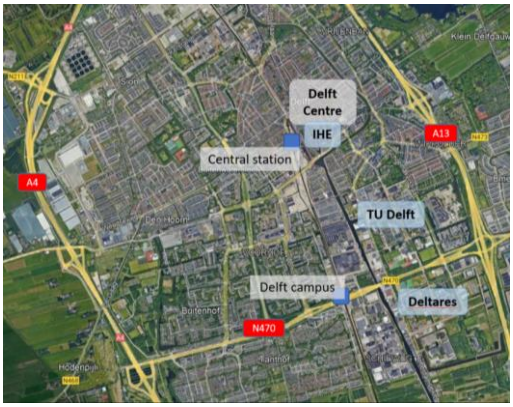
The scientific program is held on the campus of TU Delft in X-TU Delft (08:30-16:30) and at the Aula (after 16:30). It is a 10-15-minute walk between both sites.

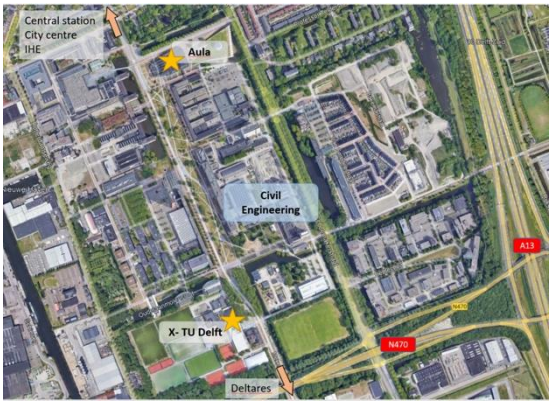
- Address X -TU Delft: Mekelweg 8, 2628 CD Delft
- Address Aula TU Delft: Mekelweg 8, 2628 CD Delft

Interactive campus map: https://iamap.tudelft.nl/en/

The campus is accessible by:

- Bike/ foot: from Delft city centre it takes 25 min to get to the campus.
    - Renting a bike: https://www.fietsplusdelft.nl/verhuur/ for ~E10,- a day.
- Public transport: from Delft Central Station, take Bus 40, 69, 174 (stop: TU Sport & Culture)
  See also www.9292ov.nl/en for the latest update on public transport schedules
- Car: Parking is free of charge on campus. The six large parking areas are well signposted on the campus ring road. Demand for parking is high. Always leave enough time to find a parking space and walk to your destination. Recommended parking locations:
    - P Sports, 5-minute walk (navigation address Van de Broekweg 1)
    - P Aula, 8-minute walk (navigation address Van der Waalsweg 1)
- Taxi: taxiDelft: +31 015 202 4666





Map 1: Map of Delft with indicated the highways (A4, A13, N470), the train stations (Central station and Delft Campus), IHE, TU Delft, Deltares.

Icebreaker and Dinner

Ice Breaker

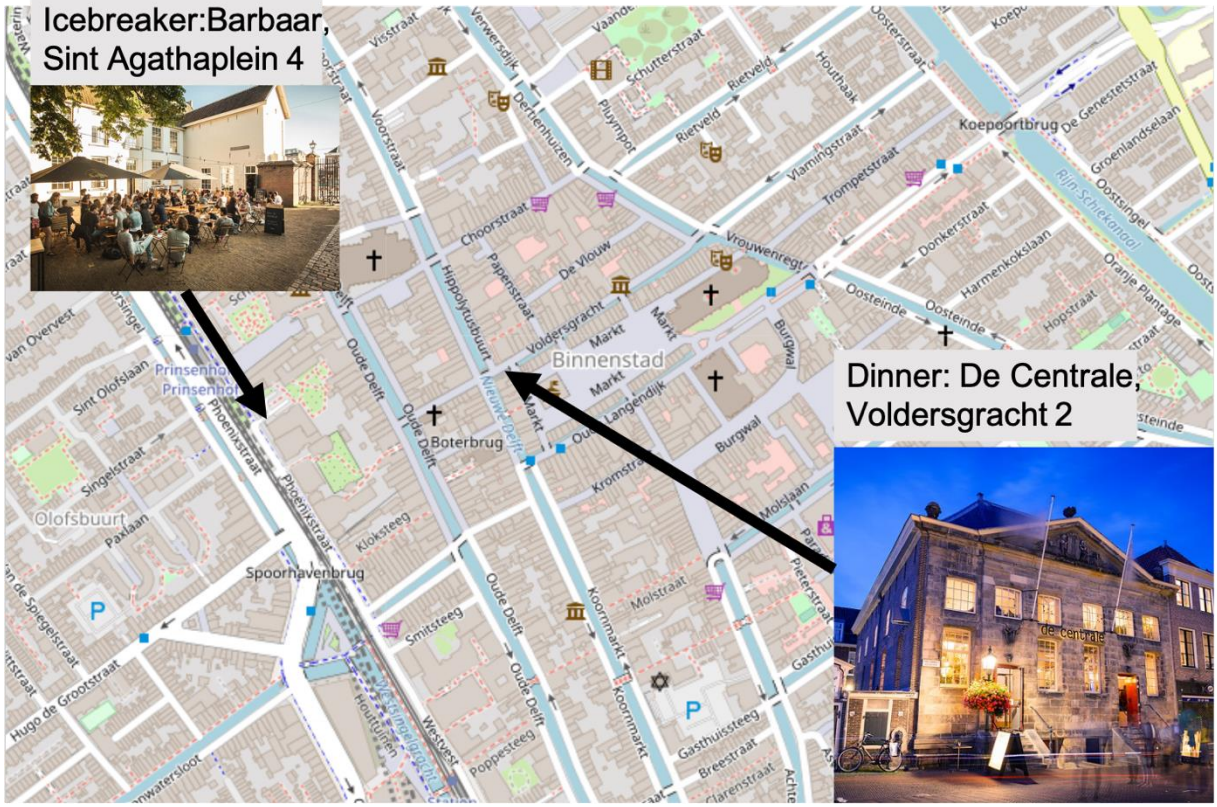
The Ice Breaker will be in the café *Barbaar*, close to the Central station. This is very close to the Museum Prinsenhof

Address: Sint Agathaplein 4, 2611 HR Delft

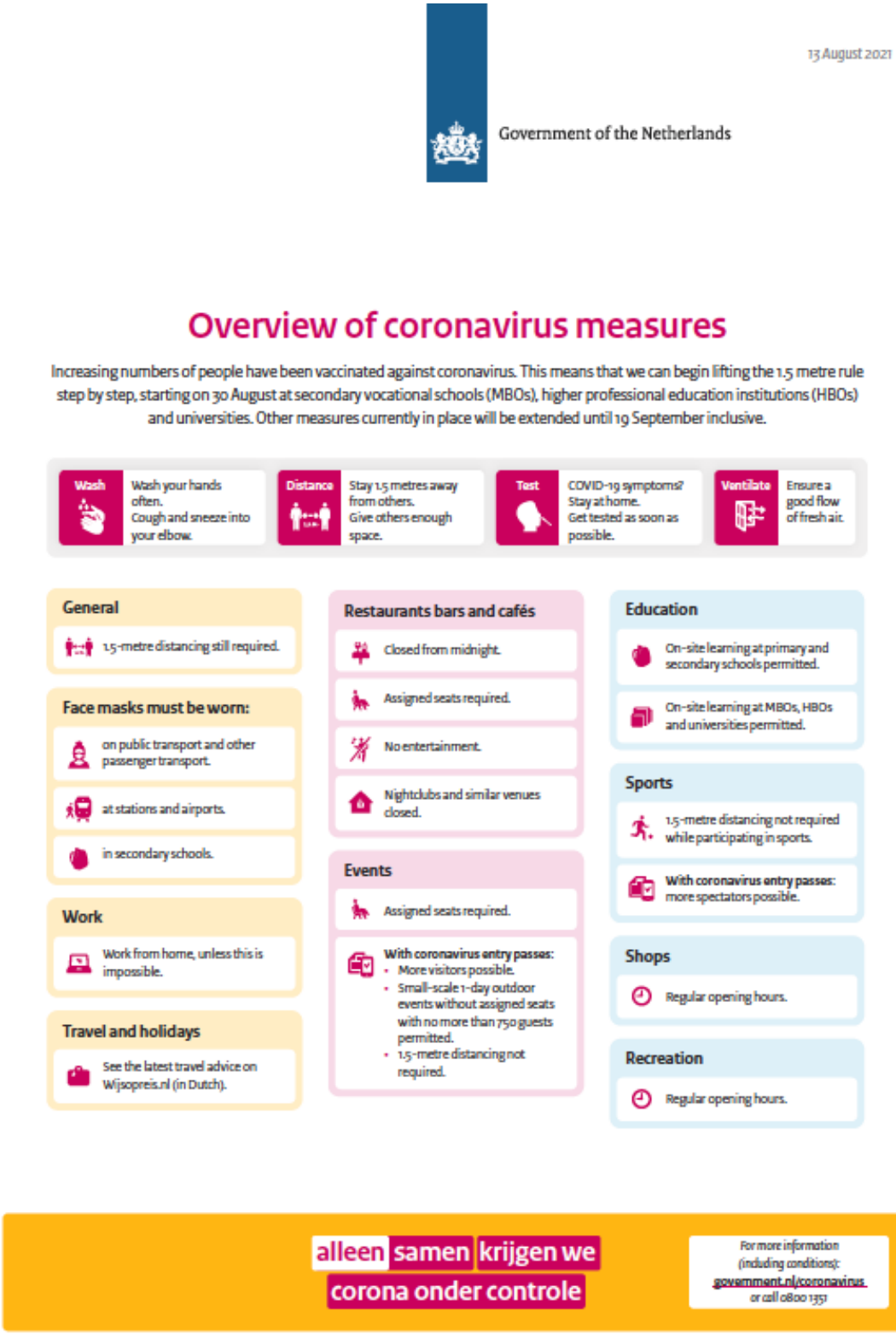
Conference Dinner

The conference dinner will take place at *De Centrale* in Delft. This is next to the Market square, just behind the townhall.

Address: Voldersgracht 2, 2611 ET Delft



COVID-19



TU Delft COVID regulations

TU Delft is an educational institution. Apart from the national regulation it is mandatory to wear a face mask when walking in TU Delft Buildings.

General contact details

All updates about the conference will be presented at:

https://www.intercoh2021.org

If you have any questions, please send us an email at:

info@intercoh2021.org

In case of emergency:

Emergency phone, number Netherlands: 112

Bram van Prooijen: +31 6 24661771

Jill Hanssen: +31 6 42196132

Ana Colina Alonso: +31 6 29430340

TU Delft alarm number: +31 15 2782777

Sponsors

Present at Intercoh: **Maeve Daugharty (**Maeve.Daugharty@nortekgroup.com**)**

Sicco Kamminga (Sicco.Kamminga@nortekgroup.com **)**

Nortek designs, develops and produces scientific instruments that apply the Doppler principle to underwater acoustics in order to measure water in motion, such as currents and waves.

We provide truly innovative, robust, and accurate instruments, backed up by advanced software and **comprehensive support** to ensure customers maximize value from their measurements.

Our solutions make a big difference.

These instruments are used by scientists, researchers and engineers at renowned institutions and government agencies worldwide. They are employed in demanding environments that require state-of-the-art instrumentation that is reliable and easy to use.

Our exploratory devices help cast light on the workings of the world's oceans, which occupy vast swathes of the planet, but are still little understood.

Most of Nortek's technology is based on a scientific physical principle called the Doppler effect. This relates to the change in frequency (or pitch) when a sound source moves with respect to an observer.

By measuring these changes in frequency/phase, our instruments accurately measure profiles of speed and direction of complex water motion.

Nortek's product portfolio ranges from wave measurement systems to single-point turbulence sensors and oceanic current profilers. Our product range covers four themes: **ocean waves, ocean currents, turbulent flow and subsea navigation**.

Our objective is to excite users with useful, innovative technology underpinned by oceanographic science and research. We work systematically with quality and are **certified by leading quality assurance organizations**.

KONINKLIJKE NEDERLANDSE
AKADEMIE VAN WETENSCHAPPEN

For science and scholarship

The Royal Netherlands Academy of Arts and Sciences was founded in 1808 as an advisory body to the Dutch Government – a role that it continues to play today. The Academy derives its authority from the quality of its members, who represent the full spectrum of scientific and scholarly endeavour and are selected on the basis of their achievements. It is also responsible for thirteen internationally renowned institutes whose research and collections put them in the vanguard of Dutch science and scholarship.

Mission

As the forum, conscience, and voice of the arts and sciences in the Netherlands, the Academy promotes quality in science and scholarship and strives to ensure that Dutch scholars and scientists contribute to cultural, social and economic progress. As a research organisation, the Academy is responsible for a group of outstanding national research institutes. It promotes innovation and knowledge valorisation within these institutes and encourages them to cooperate with one another and with university research groups.