# Welcome to stockassessment via TMB — part 2

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# Time and place

**Time:**

Monday 28 January 2019 — Friday 1 February 2019

each day from 9—17[a]

**Place:**

Atlantica Hotel, Halifax, Nova Scotia, Canada

**Form:**

Flexible mix between presentations and exercises

[a] some may need to leave early Friday?

# Prepare for course by:

- Installing TMB on your computer via the instructions on:
  https://github.com/kaskr/adcomp/wiki/Download
- Review the material from last time:
  http://www.nielsensweb.org/halifax2018
  Or similar material better organized here:
  http://www.nielsensweb.org/woodshole2018

- Report problems to an@aqua.dtu.dk

# What have we covered?

- Introduction and installation
- Running a first example
- Maximum likelihood in TMB (quick reminder: estimator, uncertainty, test)
- Getting data in and results out
- Nonlinear model example
- Dealing with parameters (bounds, phases, transformations, mapping)
- Parametric age-based stock assessment model
- Uncertainty quantification (delta-method, profile, MCMC, (bias-correction))
- Splines in TMB
- Biomass dynamic model
- Debugging TMB models
- Random effects in TMB
- Simple state-space models
- Assessment as state-space models
- Model validation in state-space models
- Simulation within the TMB code
- Checking the Laplace approximation
- Parallel computations

Don't worry we will re-visit and extend these subject as needed.

# What we want to cover this time

- Summary of what we did last time
  - What is TMB and why do we need it
  - Random effects why and how
  - Fish stock assessment model as state-space
- The different parts of the SAM model + tips and tricks
  - Recruitment, Survival, Fishing mortality
  - Catch-at-age, Survey-at-age, Total-catch, Missing observations
  - Robustifying
  - ...
- What are the differences to NCAM?
  - Censored data
  - Different transformation of data
- Model selection and validation
- How can we deal with length data
- Spatial models

# Suggestion for preliminary agenda

**Monday**

09-13: Intro, reminder, and exercise

14-17: Multivariate normal and ways to use in TMB

**Tuesday**

09-13: Dissecting SAM 1: Look at each process and its implementation

14-17: Dissecting SAM 2: Look at each observation type and its implementation

**Wednesday**

09-13: Practicalities of working with and modifying SAM: Stockassessment[.org], github

14-17: NCAM similarities and differences

**Thursday**

09-13: Spatial models in TMB

14-17: Comparing and validating assessment models

**Friday**

09-13: Summary, catch up, and wrap up.

14-17: Working on own examples or heading home.

# Comments to preliminary agenda:

- All subjects will be mixture of presentations and exercises.
- It may look tight, but it should allow us time for interesting detours and your suggestions
- Please send comments and suggestions to: an@aqua.dtu.dk

Looking forward to see you in Halifax!