



## Laudatio für Jørgen Randers

Dear Madam President,  
dear Mr Dean,  
dear Mr Schuster,  
dear Present,

Dear Jørgen,

I never gave a laudatory address for anyone – and probably never will again – so I asked Mr. Schuster and Mr. Løhr for some tips about what I should say. And they told me to speak about Jørgen the researcher and Jørgen the person – but not too long!

This advice sounded to me as if there is a difference between the person and the researcher – but with Jørgen there is not.

Instead, he is now, and he has been, and, most likely, will always be a science-based activist.

A science-based activist in all that he does, says, and sets in motion.

So, what has he been ‘activating’ for and against?

There are, at least, 3 main areas of activism in Jørgen’s life that I want to shine a little light on tonight.

- 1) He has fought all his life against linear thinking and for closed loop feedback thinking
- 2) He has fought against correlational thinking and for physical-causal thinking, and
- 3) He has fought all his life against equilibrium thinking and for complex adaptive thinking

Let me illustrate these areas, briefly, each with a project he and I – and over the years many others – worked on in the past and are still working on today.

### 1) linear vs. closed loop feedback thinking

Jorgen, being a Norwegian, had a few friends in the shipping investment community – when Norwegians still dominated that particular field. Shipping, at least the international part, is probably as close as you can get to an unfettered economic market. Truly great fortunes can be made when times are good, but you can also lose your shirt in the blink of an eye. So, a friend, who knew about his work on the *Limits to Growth* model at MIT, asked him if he could not develop a model of the shipping market – a bit more modest than this model of the predicament of humankind – that could give advice on when to buy and when to sell shipping tonnage.

You need to know that starting in the 1930ties, the conventional wisdom in the market was that it takes a political crisis, a war, a canal closure, a dramatic event *outside* the market – i.e. a linear conventional cause-effect thinking that is the common thinking in economics to this day - to trigger the sky-high freight rates to deliver the returns all market players dream of. So, understanding the market was akin to understanding – guessing, divining – these external shocks and their timing. A bit like predicting earthquakes.

Jorgen’s take on what caused the ups and down in the market turned this conventional wisdom inside out: He asked, what is the behaviour, what are the decisions of the market players *themselves* that might result in the regular boom and bust cycles we saw, and still see today, in the market.



The answer is surprisingly simple: *it is the collective ordering of additional shipping tonnage during boom times that is the root cause of the market behaviour.* When times are really good, the revenue from one or two trades pays for the entire vessel which has a lifetime of around 15 years. So, it is easy to decide to order just one more since the risks are so low. The result is that routinely about 80% or more of the existing fleet are on order during these good times. Each individual player sees, actually experiences only the rush of the boom, not the collective orderbook and hence places his or hers one additional order. This is possible because both buyers (investors) and sellers (shipyards) of tonnage are widely dispersed and treat their transactions as business secrets.

Jørgen's focus on internal, one may say self-inflicted, closed-loop-feedback causes led to a decade long fruitful and, for the investors very profitable, interaction<sup>1</sup>. You can read the details in the paper linked below.

## 2) correlational vs. physical & causal thinking

From 2008 to 2013 Jørgen was the Toyota professor of climate change at the Norwegian Business School. But rather than build an institute with the money he was granted he built a simulation model of earth's climate system and our anthropogenic role in it.

The state of the art at the time were large so-called general circulation models. They cut the atmosphere, the oceans and land into boxes and squares. 3-dimensional boxes for the former two and 2-dimensional squares for the latter one. They use Navier-Stokes differential equations to describe how fluids, gases or energy flow from one box or square to each adjacent one. From rudimentary beginnings in the 1950ties with 1 box for the atmosphere and 1 for the ocean, the granularity steadily increased as computing power became cheaper and cheaper. Today we are at resolutions of a few kilometres in each direction.

In the quest for ever finer granularity 2 things got lost: The currents in the ocean<sup>2</sup>, like the Gulf Stream, and the distribution of all greenhouse gases in the atmosphere. For the former, some maverick researchers have taken up to quest for understanding the ocean currents and their potential tipping points<sup>3</sup>. For the latter two ad-hoc assumptions were introduced: 1) Greenhouse gases are well-mixed – which is true for all but the most potent one, H<sub>2</sub>O which in the form of clouds, rain, ice, snow and gas certainly is not 'well-mixed', and 2) correlational functions<sup>4</sup> for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O were introduced. These correlations describe well enough the *past* impact on global warming. But as you all know, models built on correlations are not safe tools for prediction beyond the range of the data they were trained on. To paper this over, the label 'forcing' was given to these correlations imputing an active agency.

And finally, H<sub>2</sub>O, the strongest and least well-mixed green-house gas, was and is treated not as man-made greenhouse gas in its own right but as a multiplier of the other, man-emitted, ones.

By now general circulation models have really run roughshod over the physical-chemical causality of the gases: 1) all greenhouse gases except H<sub>2</sub>O are *emission* driven: We emit them, they get into the atmosphere, some are absorbed by the ocean, some by land and the

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<sup>1</sup> Those of you interested in the details, have look at <https://onlinelibrary.wiley.com/doi/abs/10.1002/sdr.376>

<sup>2</sup> <https://www.britannica.com/science/ocean-current>

<sup>3</sup> <https://www.geomar.de/en/news/article/wie-nah-ist-der-kipp-punkt>

<sup>4</sup> <https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/98GL01908> Table 3



remainder blocks part of the energy spectrum travelling from earth to space. If we stop emitting, eventually, and for some gases this will be a long, long time, they revert to their pre-emission concentration.

For H<sub>2</sub>O, the physical causality is different: it is entirely *temperature* driven. No one needs to emit it, as long as there is moisture to evaporate – and given the volume of the oceans that will be a while – the temperature stays high, more H<sub>2</sub>O will evaporate, increase its concentration in the atmosphere and increase its energy blocking work. In other words, emitting greenhouse gases over the last two hundred years has caused a *regime change* in the global climate system, a profound effect that simply slips through every mainstream climate model, no matter how fine its granularity.

Jorgen's model instead builds up the physical causality from first principles. Time does not allow me to go in the details here, but to those of you interested I invite you to read the results of Jorgen's insistence on physical-causal thinking in the two links below<sup>5</sup>.

### 3) equilibrium vs complex-adaptive thinking

Arguably the most damage to the well-being of us humans and the planet that sustains us has been done by equilibrium thinking, which is the theoretical underpinning of our relentless quest for growth. Jorgen will talk about his struggles against this thinking in his speech and go into great pedagogical detail in his seminar tomorrow – which I urge you all to attend. So let me tonight just set the scene with a few comments about the alternative, complex-adaptive thinking applied to one particular economic concept, GDP per person, perhaps the holy grail of economics.

Linear equilibrium thinking argues like this:

$$\text{GDP pp} = f(\text{GDP}, \text{Population}) \quad (1)$$

$$\text{GDP} = f(\text{GDP growth}) \quad (2)$$

$$\text{Population} = f(\text{Population growth}) \quad (3)$$

And stops here.

But we know from the demographers that fertility declines as nations get richer:

$$\text{Population growth} = f(\text{GDP pp}) \quad (4)$$

And we know that GDP growth declines as nations get richer, because more and more people work in the service sector and here especially the care, culture and innovation sectors where productivity growth is more and more difficult to sustain:

$$\text{GDP growth} = f(\text{GDP pp}) \quad (5)$$

Adding equations (4) and (5) turns the linear equilibrium view into a complex adaptive one – it is as simple as that. Jorgen will offer you in his speech and his seminar many more such surprisingly simple extensions so that you all may become complex-adaptive systems thinkers before he is done. But the end results will be transformative:

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<sup>5</sup> <https://esd.copernicus.org/articles/7/831/2016/> and <https://www.nature.com/articles/s41598-020-75481-z>



In his speech today and tomorrow in his seminar Jorgen will take you on a remarkable intellectual journey that has as its goal nothing less than to increase the well-being of average people everywhere.

Science-based-activism.

That in getting there he must debunk much of mainstream economic thinking is, I suggest to you, a small price to pay.

In addition to these life-long struggles – for systems thinking<sup>6</sup> in best sense of the word – Jorgen has also been instrumental in conceiving and establishing ecological metrics we all use today as a matter of fact: 1) the ecological footprint<sup>7</sup> and 2) the living plant index<sup>8</sup>

I am sure you all know about them, so, in the interest of ‘not being too long’, I leave it at that. If you don’t know about them, just follow the links at the bottom.

And he has been a businessman, a deputy director general of the WWF, a high-level advisor to many governments, a president of a business school and, starting with *The Limits to Growth*, followed by *2052* and *Earth4All* a truly best-selling author. But my time is coming to an end.

Allow me therefore to end on a personal note. Jorgen’s third area of activism, the fight against equilibrium thinking, is, most likely the most difficult one. Because there is an unholy alliance between this kind of thinking and economics.

As Eric Beinhocker<sup>9</sup> and others have pointed out, economics is not just flawed because of this unholy alliance, it is also flawed because of the deeply pessimistic view of humans and what makes us tick, that sits at the core of economic thinking, and therefore of economic models and policy advice. Embodied in the assumption that the behaviour of each and every one of us can be usefully reduced to the homo economicus in us. Apparently, we all buy at 2 and try to sell at 3. And no more.

Jørgen, instead puts a different human, homo magnanimous at the core of his view of the world – a human that is brave, bold, and noble in spirit.

Where is the personal note, you may ask. Well, to answer I have to quickly go back 46 years, to the fall of 1977. I had just gotten my bachelor’s degree from an obscure little liberal arts college in the US and had written to Jørgen to ask if he would take me on as an intern. Not only did he do so without a second thought, but he also became my teacher, my mentor and counsellor. And I became his apprentice. 46 years later, I am still his apprentice, I am still learning from him, and I still seek his counsel.

That lifelong patience and generosity, I submit to you, is testimony to his eminent qualification, over and beyond his deep intellectual qualification, for his one remaining task, to help liberate economics from its debilitating reduction to equilibrium thinking and its inadequate view of human nature.

Thank you, Jorgen, and good luck for the future, with all that lies ahead.

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<sup>6</sup> <https://thesystemsthinker.com/the-thinking-in-systems-thinking-how-can-we-make-it-easier-to-master/>

<sup>7</sup> <https://www.footprintnetwork.org/our-work/>

<sup>8</sup> <https://www.livingplanetindex.org/>

<sup>9</sup> <https://www.youtube.com/watch?v=fzI3X30f9dc>