Towards (s)low-tech computer science?

thoughts on the place of computer scientists in an upcoming ecological crisis

Naomod Christmas Seminar 2020

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Computers are *awesome*

Important facts

- Computers allow us to organize society,
- Computers allow us to do science,
- Computers make our lives incredibly better,
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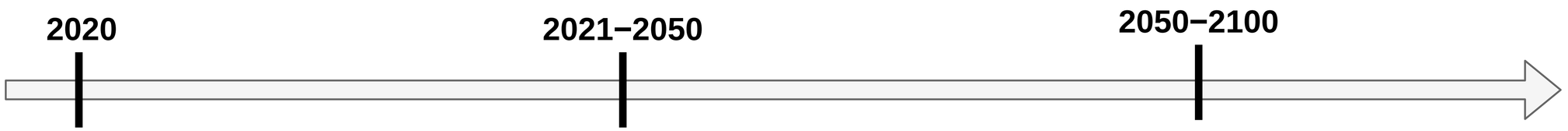
Even better: *computer science is awesome*

- We create more applications, more languages, more methods, more tools!
- Very interesting, fun and and arguably crucial endeavor.

Computers are resource-consuming *monsters* 💀

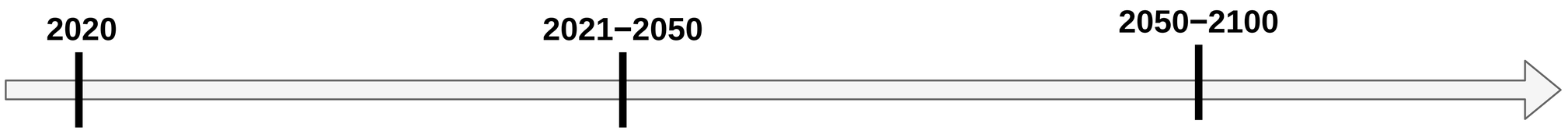
- 4% of greenhouse effect gas come from the digital industry (in 2020),
- 1.6 billion smartphones are sold every year, and now IoT devices keep arriving,
- Huge amount of (finite) resources must be mined from the ground
- Recycling e-waste is an almost impossible task (delegated to poor countries)
- Building computers require a very sophisticated supply chain.

A look at possible (digital) futures 🌡



Current state of human societies

A look at possible (digital) futures 🌡



Current state of human societies

Major climate change with already difficult consequences (eg. agriculture production collapse, water shortage)

+2°C

Huge climate change with a **possible end of human life**

+4°C

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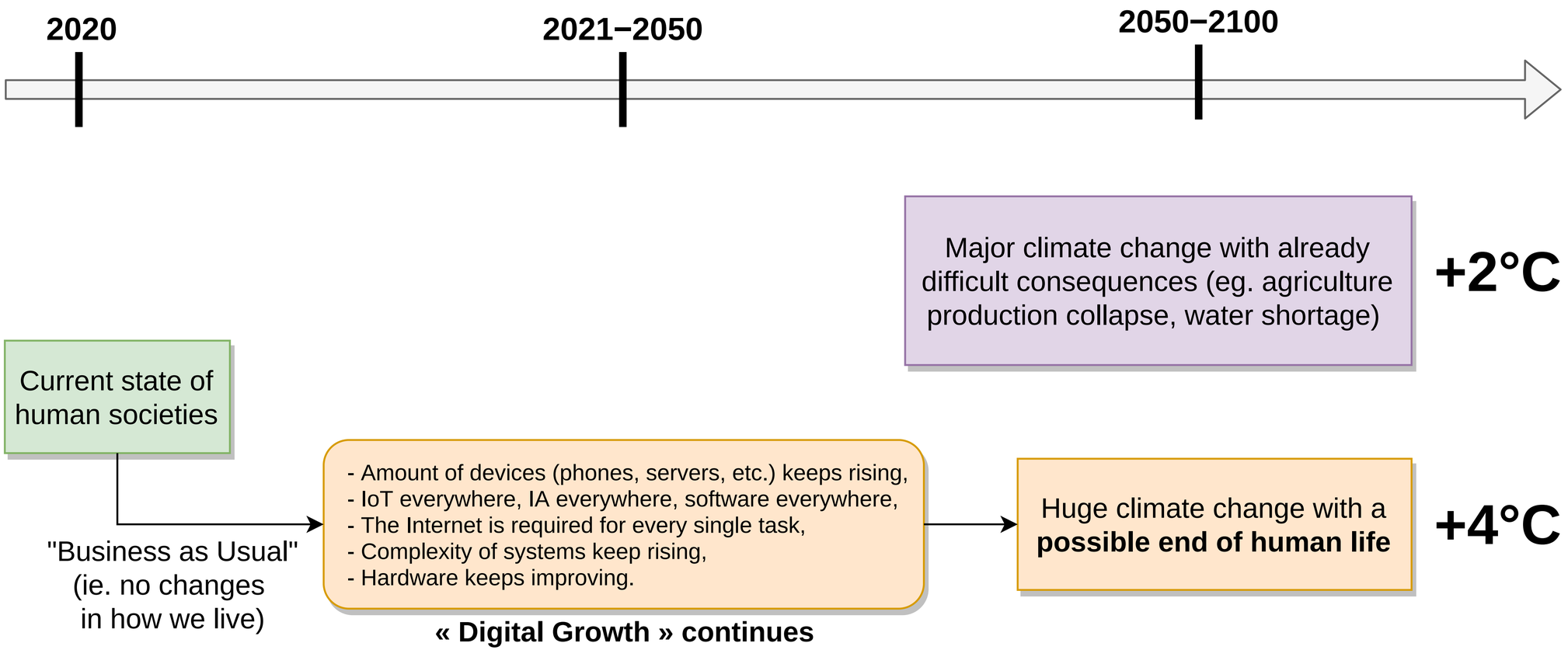

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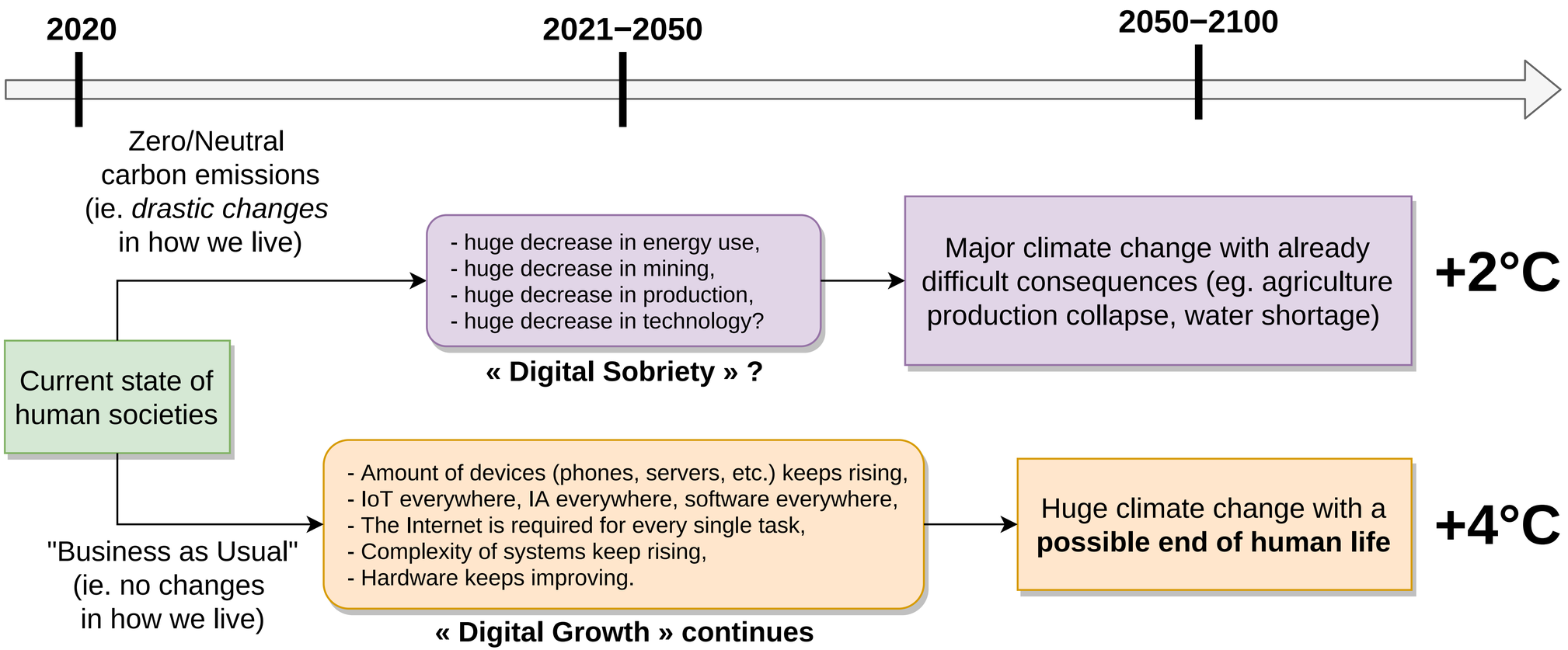

What about us?

If we consider that research is about "inventing the future"...

which future are we currently inventing?

A look at research in Model-Driven Engineering (MDE)

Excerpts from MODELS 2020 abstracts:

> « *Technological advances enable new kinds of smart environments exhibiting complex behaviors; smart cities are a notable example…*

> « *The increasing complexity of embedded systems renders verification of software programs more complex…*

> « *Model-Driven Engineering has been proposed to increase the productivity of developing a software system…*

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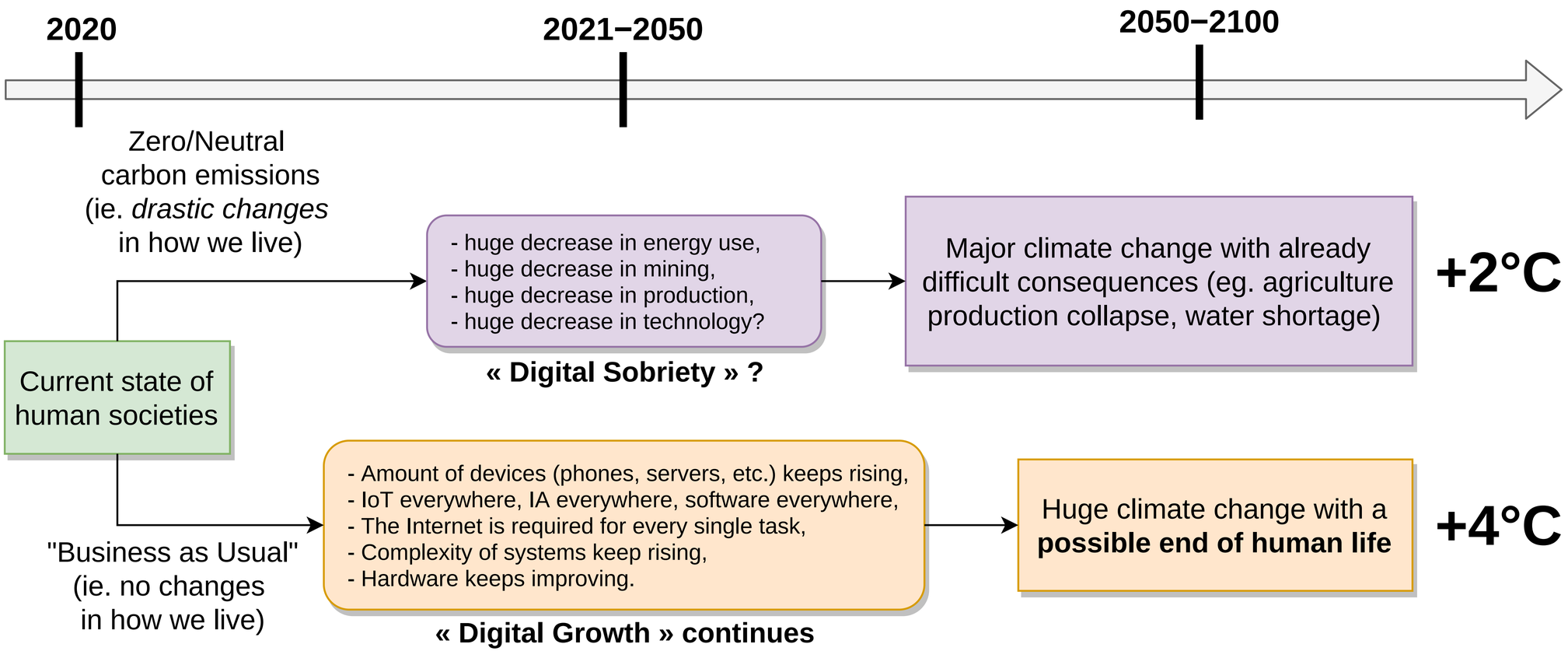
- Our grand noble goal is to "manage complexity" through abstractions…
- ie. making it easier, faster for engineers to build always more and bigger high-tech systems (eg. autonomous cars, satellites).

Which future do we (computer scientists) dream of?



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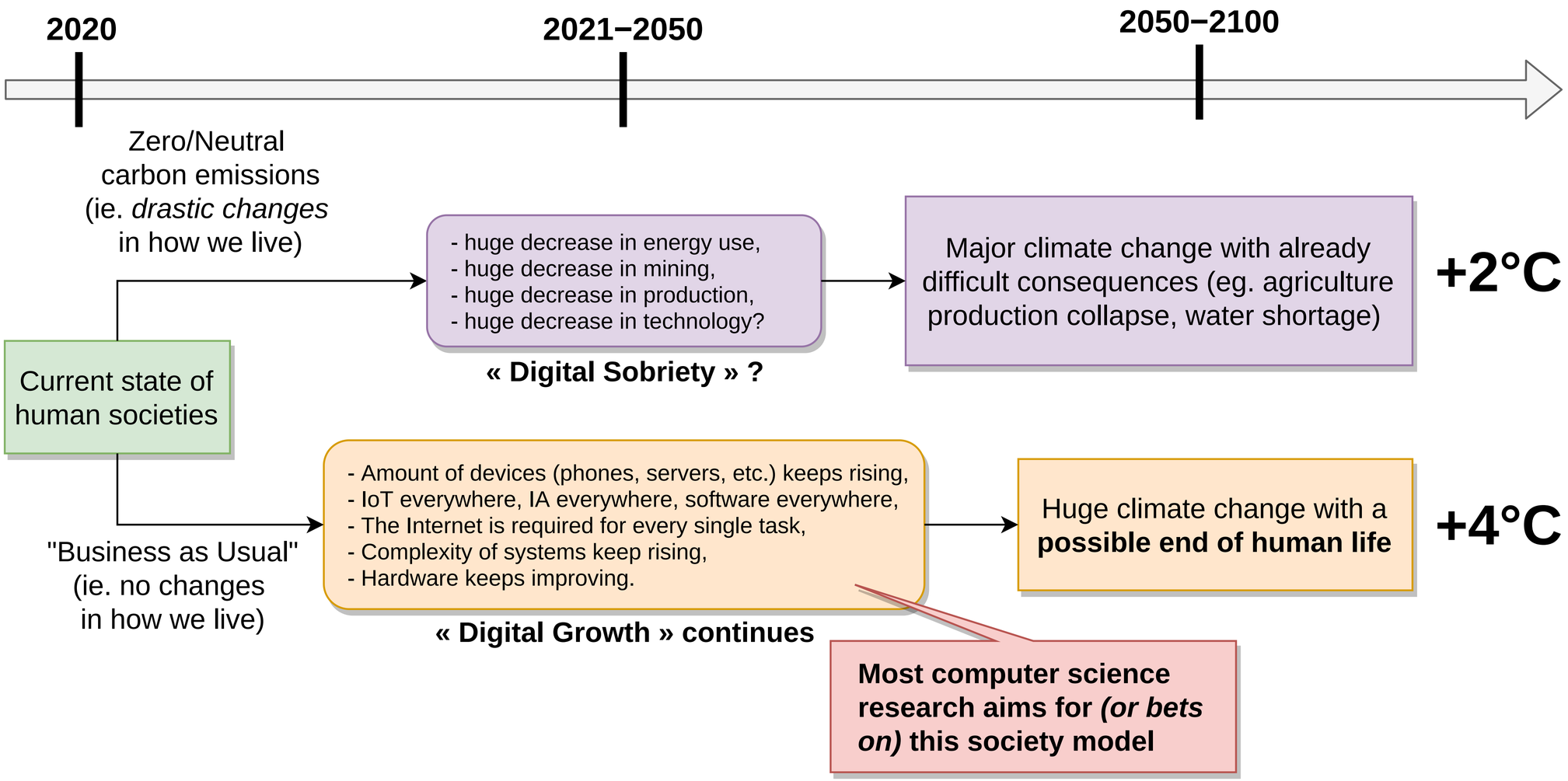

Towards "low-tech" or "slow-tech" computer science?

In summary, we are directly contributing to "high-tech", which:

- relies on a world with an *extreme abundance* of energy and resources,
- relies on stable internet, stable electricity, stable production of new devices,
- makes the ecological crisis *even worse* (pollution, energy use).

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Therefore should not we start imagining a "(s)low-tech" world:

- where we stop making huge amounts of new devices every day?
- where we are hence compelled to reuse old computers and electronics?
- where systems function in a very unreliable environment (old machines, little or no internet, unreliable electricity)?

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And as scientists, should we not start wondering what research we should be doing for such a future world?

Thank you for your attention ☺

What do you think?

Disclaimer: this talk was voluntarily provocative, I am no climate expert and cannot predict the future… but I am worried!