

# Company Overview

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simbeyond

*Take your simulations to the next level*

# Simbeyond at a glance



## Our company

- Is committed to reduce time to market and improve efficiency and lifetime of OLED displays
- Combines Device Physics, Molecular Engineering and Computer Science competences
- Takes device performance simulations in OLED display industry to a new, unprecedented level

## Our first product family: Bumblebee



- Is a suite of state-of-the-art simulation tools and services for OLED stack development
- Uses a unique approach, allowing users to analyze, predict and improve device performance
- Facilitates shorter development cycles of device manufacturers and material suppliers

## Our partners

- Eindhoven University of Technology in The Netherlands
- NanoNextNL, Dutch government-funded nanotechnology organization



# Challenges for OLED stack development

## Challenges in performance optimization of OLED stacks

- Due to the complex and delicate interplay between charges and excitations at the molecular scale, optimizing device performance and getting the most out of organic materials remains challenging
- Without simulation, optimization typically occurs by performing time-consuming experiments on large and labour-intensive sets of devices containing a broad variation of parameter combinations
- Often, optimization has to start over when new material combinations are introduced

## Limitations of one-dimensional (1D) simulations

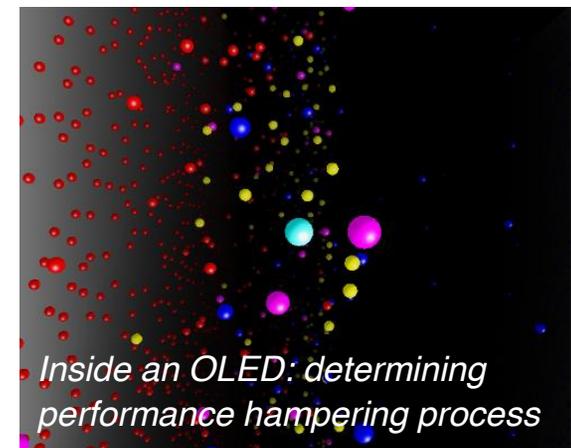
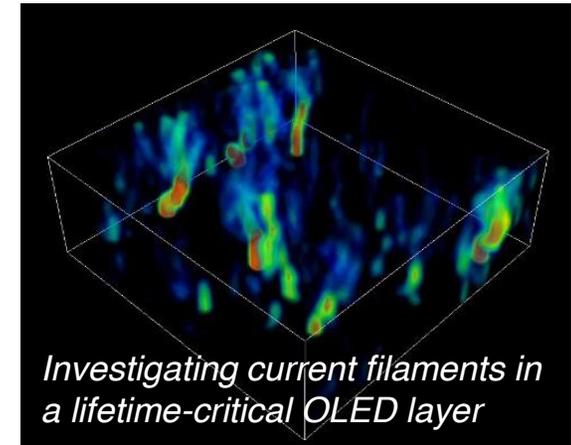
- Use of parametric 1D simulation software for electrical characterization is already wide-spread
- However, this is not suitable for material compositions often used in state-of-the-art OLEDs
- Also, 1D approaches are inadequate in describing excitonic processes, determining device performance

Simbeyond enables to address these challenges with a **predictive 3D OLED model**

# A new phase in OLED stack development has begun

## Bumblebee: from the molecule to the device

- Advanced tool that allows to simulate all relevant electronic and excitonic processes in OLEDs, at the molecular scale, in all three dimensions, and from nanosecond timescale to full device lifetime
- Simulations predict:
  - Electrical characteristics
  - Efficiency (roll-off)
  - Colour point and colour stability
  - Device lifetime
- Predictions based on physically meaningful material parameters, which may be obtained, e.g., from a few dedicated experiments on simple devices
- Bumblebee predicts the performance of any combination of materials and stack architectures, over a wide range of operational conditions



# Why Simbeyond?

## Differentiating features

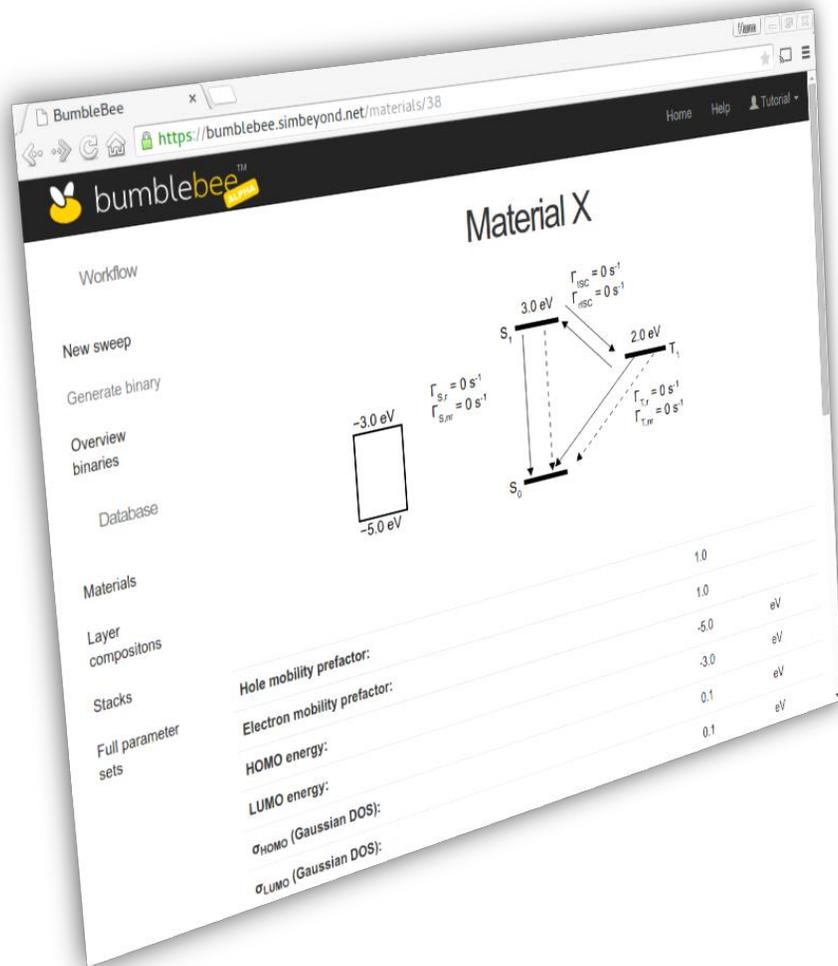
- ✓ Predictions of device performance far beyond present tools
- ✓ Unique time and 3D spatially resolved views of the device functioning
- ✓ Intuitive user interface to start dozens of simulations with a single command
- ✓ Runs via the cloud or on available computational infrastructure
- ✓ Consultancy and support from a team of leading experts in the domain of OLED device physics, experiments, analysis and advanced modelling

*“With Bumblebee a significant part of the costly and time-consuming OLED material and stack development process can be replaced with simulations”*

## Qualifications

- Bumblebee is intensively used in the industry to more efficiently develop state-of-the-art OLED stacks and solve real-life problems as well as in academic environments to perform cutting-edge research
- Very positive feedback has been received from current users, who stress the sensitivity of efficiency and lifetime to minor changes in layer compositions, where empirical R&D spends are substantial and where 1D models are found to be inadequate

# Just a mouse-click away...



For a live demonstration, go to

<http://demo.simbeyond.net>

and login with

username  
*demo@simbeyond.net*

password  
*demodemo*



*[www.simbeyond.com](http://www.simbeyond.com)*

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