

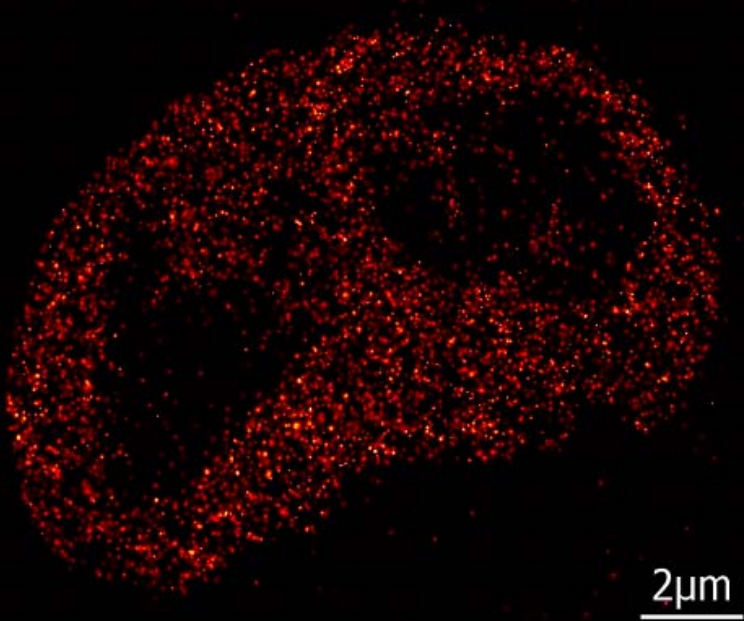
# Vertico – SMI/SPDM

## A New Era of Optical Nanoscopy

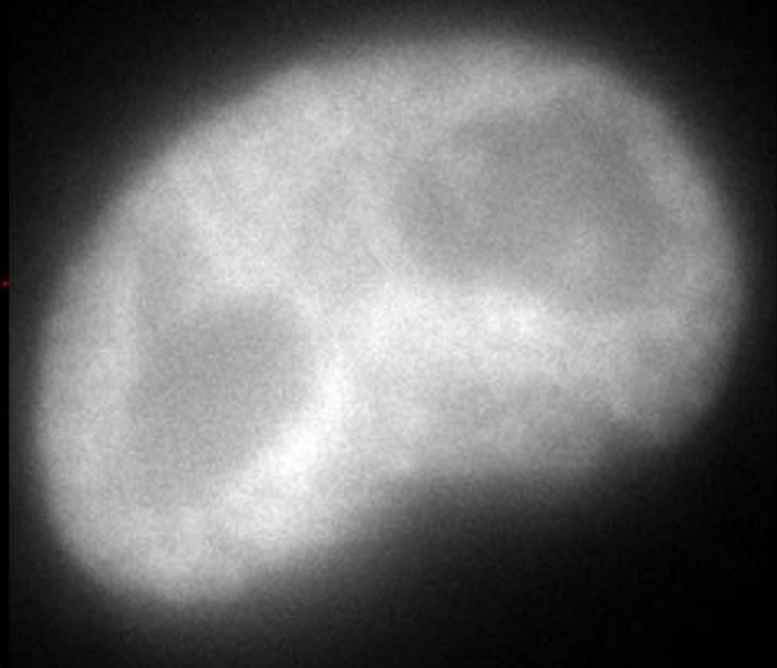
Inventor: Prof. Christoph Cremer,  
University of Heidelberg

# Superresolution Microscopy

Vertico-SMI



Standard Microscopy



Imaging of single molecules

# Definition

- Surpassing the limit of light microscopy (Abbe`s law 1873, 200 nm limit)
- Vertico-SMI: Superresolution microscopy (10 nm in 2D, 40 nm in 3D)
- Fast + wide + nano + in vivo

## Legal basis

Issued patents of the microscopy technology

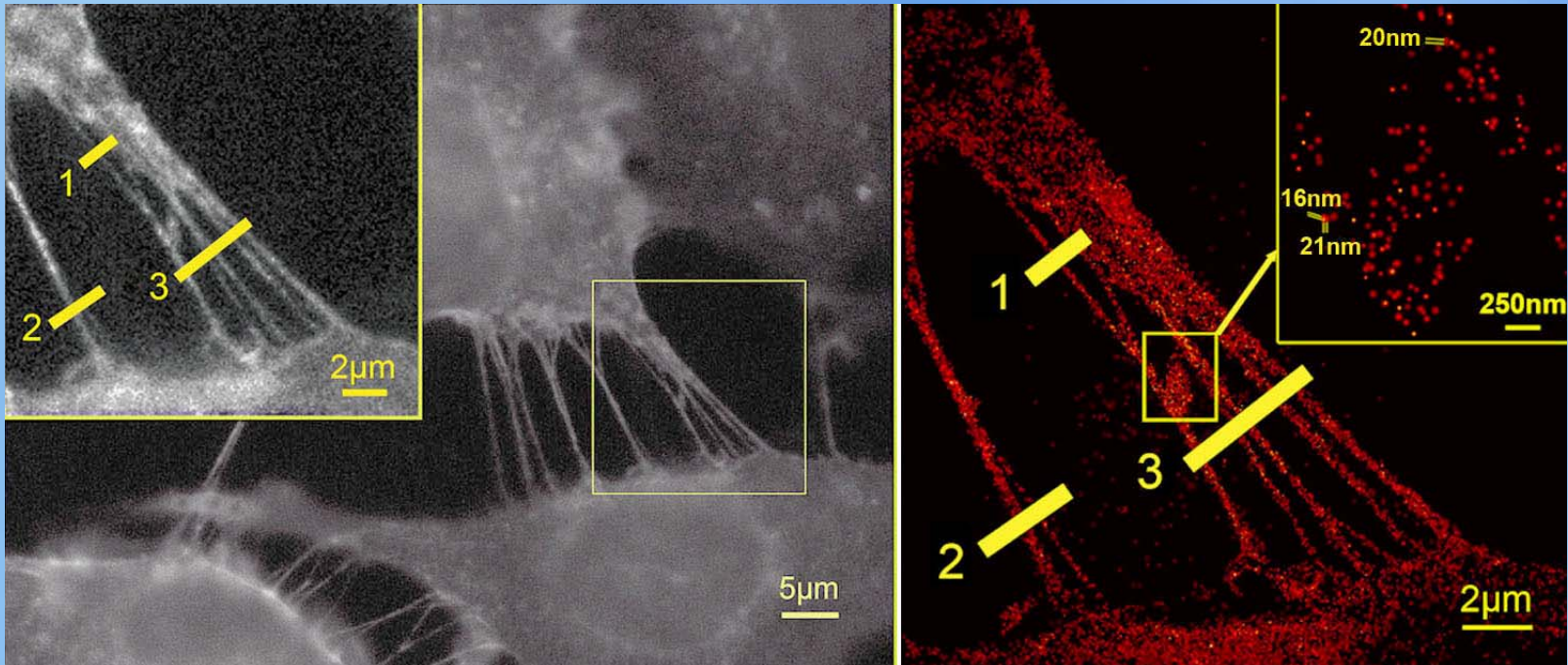
Patent applications 2008/09

Patented microscopy applications

# Fields of Application

- **Biotechnological and medical applications**  
Cancer, Kardiology, Pharmaceuticals  
Molecular biology, Stem cells  
Virology, Bacteriology
- **Materials research**  
Analysis of nanodamage, Quality control  
Semi conductor industry  
Environmental research

# Imaging of cellular nano structures



Widefield images of membrane protrusions  
From the 4 cell image to the single molecule

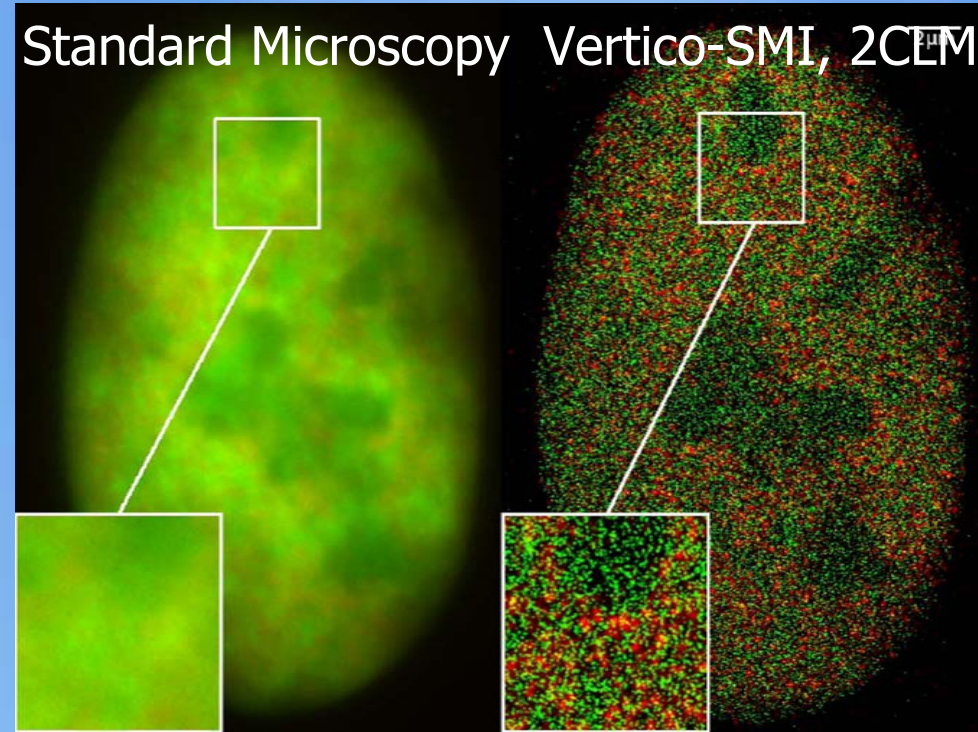
# IT-Developments

- Complete 3D Image: 2000 frames /40 sec
  - Substantial faster processing of frames
  - Short time from shots to final image
  - 2008 IT patent application (US/Europe)
- ➔ Basis for faster processing in comparison to other microscopes
- 2 minutes: 1 colour superresolution
  - 3 minutes: 2 colour superresolution (2CLM)
- from the first photo (frame) to the complete final picture*

# Revolution for the scientific user

## Green fluorescent protein GFP

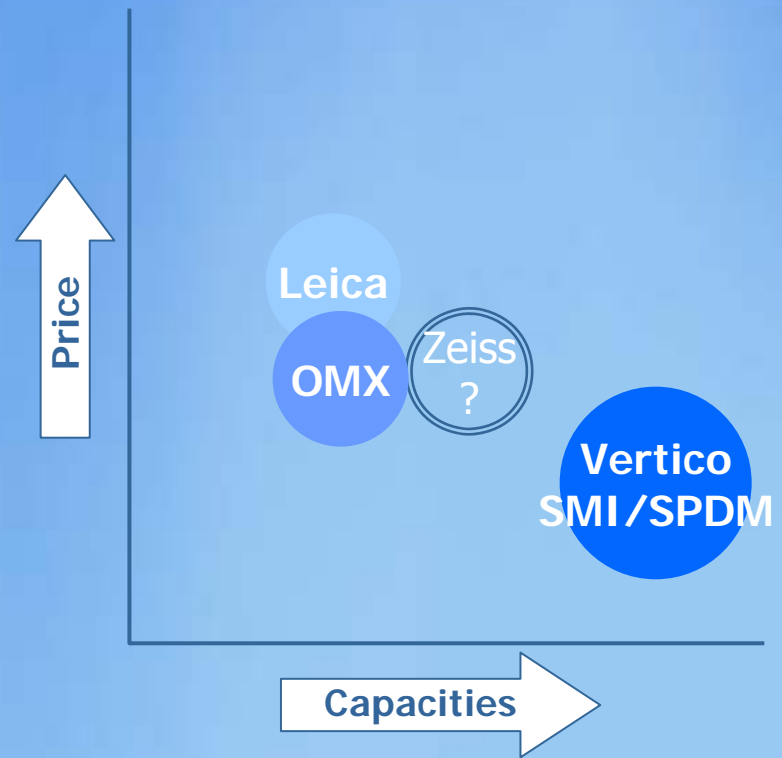
- Very important cell biology tool
- Nobel Prize in Chemistry 2008
- GFP, YFP superresolution only with Vertico-SMI/SPDM
- Millions of biological GFP samples (genes, cells, animals)
- Same lab procedures – but now results at the nanoscale!
- Colocalization of 2: GFP, RFP
- Multicolor possible (e.g. GFP, YFP, RFP)
- Counting of single molecules



2 Color GFP/RFP superresolution

# Competitors

- Placement of prototypes or first few sales financed by scientific grants
- Technical restriction
  - focussed - far-field  
(smaller area, substantially more time consuming for the same result/area)
  - specifically switchable – normal dyes  
(more time-consuming, more expensive, substantial application restrictions)
- Some competitive patents not issued – Vertico-SMI basic patents issued



# Market

- **Vertico-SMI/SPDM: extremely economical**
  - High optical performance
  - vast range of applications
  - production and maintenance costs far below that of other high end optical microscopes
- **~ Pharmaceuticals industry, Research Institutes**
- **~ Hospitals, smaller laboratories and surgeries**
  - Diagnostics using simplified versions of the Vertico-SMI/SPDM
- **Materials research:**
  - Nano damage analysis, quality control
  - Semiconductor industry
- **Nano detection**
  - Detection of substances in attomolar concentration
  - Environmental research
- **Automated High-throughput Screening Equipment:**  
integrable

# Public relations

- Presentations, print & online media
- Scientific & broader audience

# Outlook

- Spin-off with an experienced partner in the field
- Prototypes at the University
  - Manufacturing with the partner
- Common sales channels

# Vertico - SMI

## A New Era of Optical Nanoscopy

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