



UniversitätsKlinikum Heidelberg

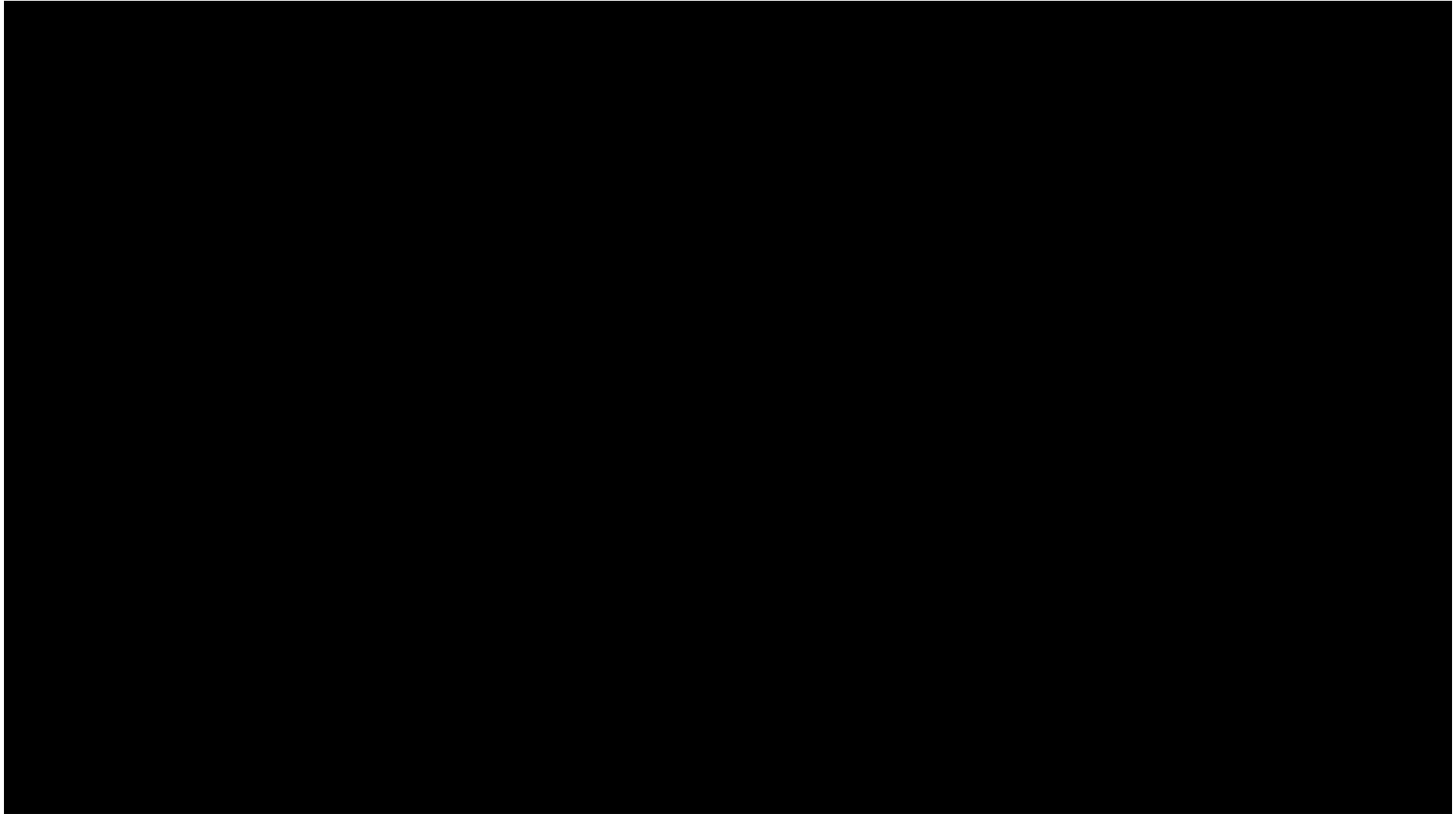
Cognition-Guided Surgery

A New Paradigm?

Beat P. Müller, Hannes G. Kenngott,
Markus W. Büchler



Autonomous Cars



Surgery Yesterday





Surgery Today

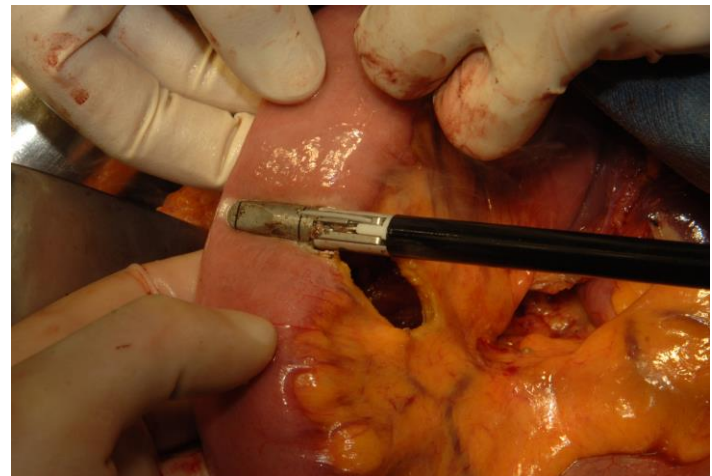
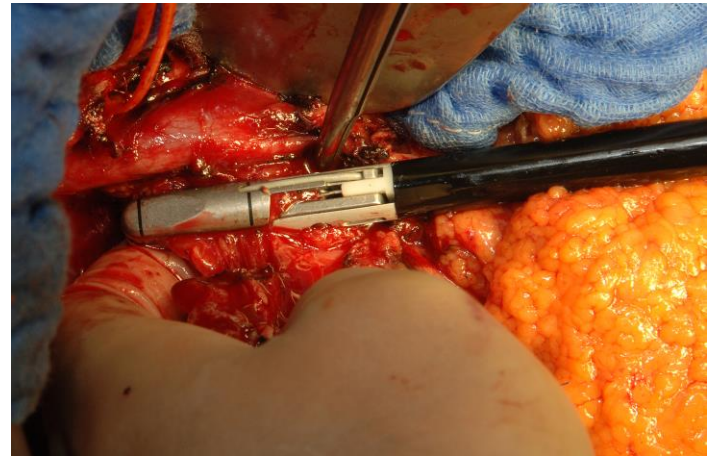


Surgery Today

Tissue Sealing Devices



LigaSure Impact™



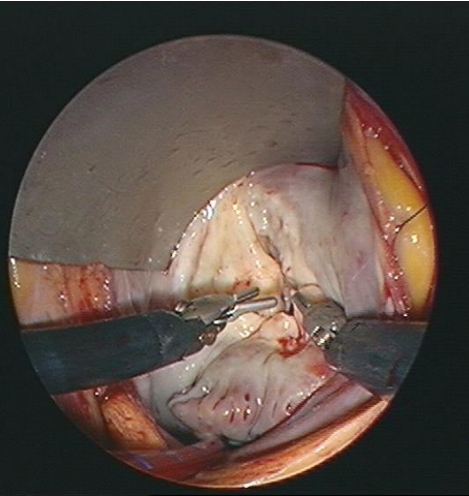
Surgery Today

Robotic Assistance



Surgery Today

Robotic Assistance



- Ergonomic position
- 3D Visualization
- Intuitive guidance
- Endowrist-Instruments
- Downscaling of movements
- Tremor filter



Surgery Today Intraoperative Imaging



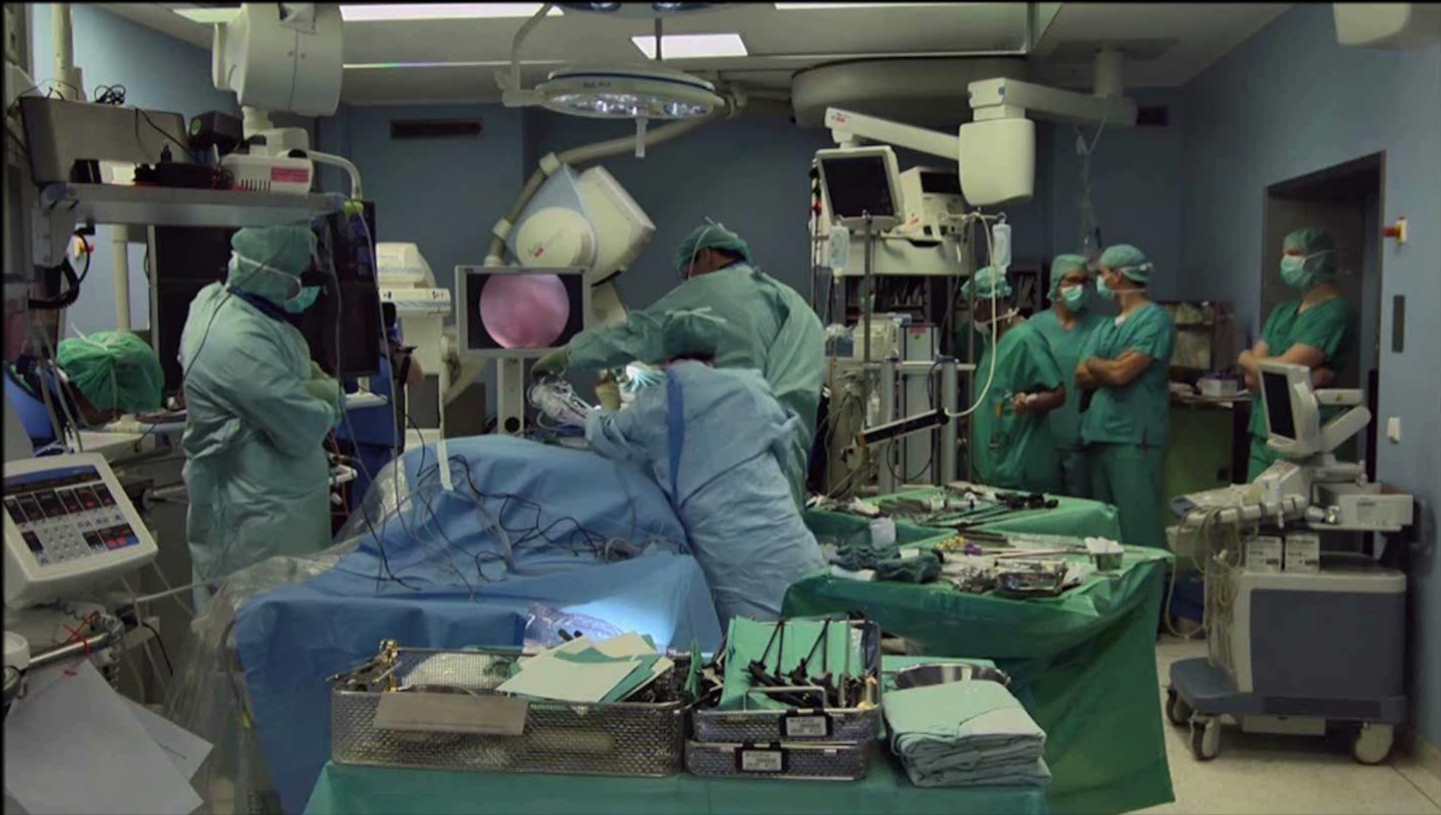
Surgery Today in Use

Hepatocellular Carcinoma

- M, 62a
- HCC Segm. 6
- 1,9 cm
- Hepatitis C
- Child A

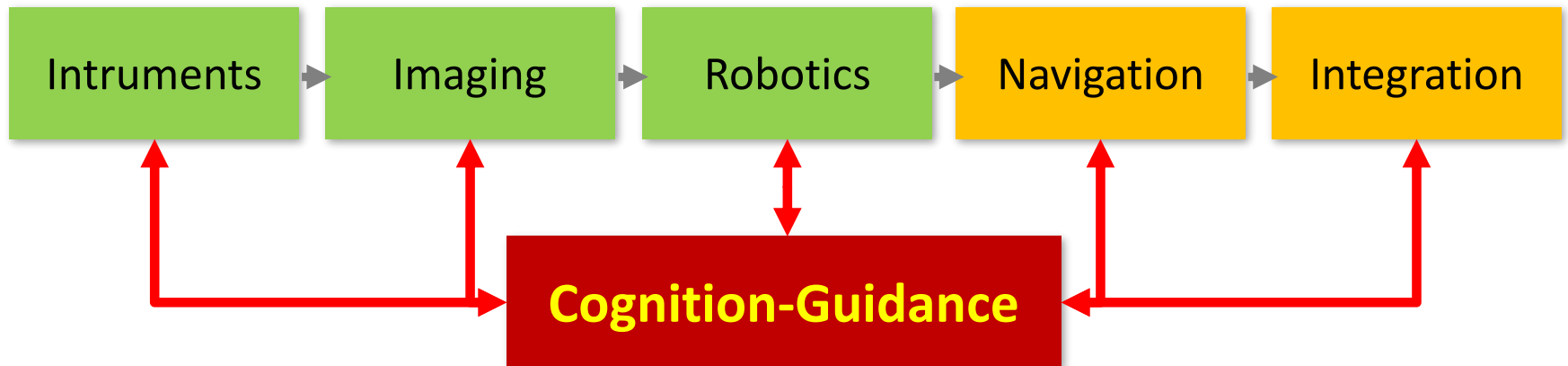


Surgery Today in Use



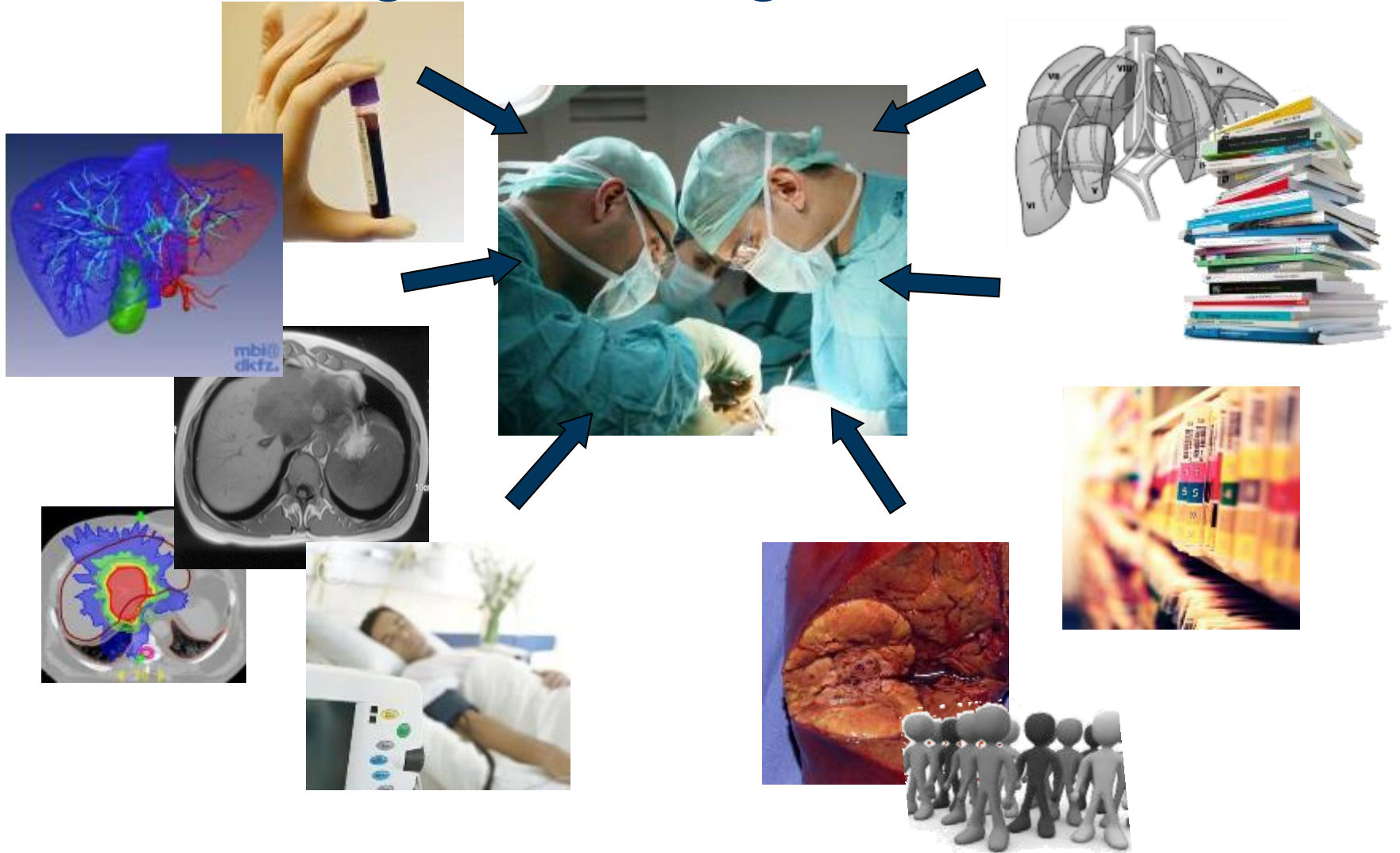


Computer-Based Assistance State-of-the-Art



Reality in Surgery Today

Overwelving Knowledge and Information





Cognition-Guided Surgery



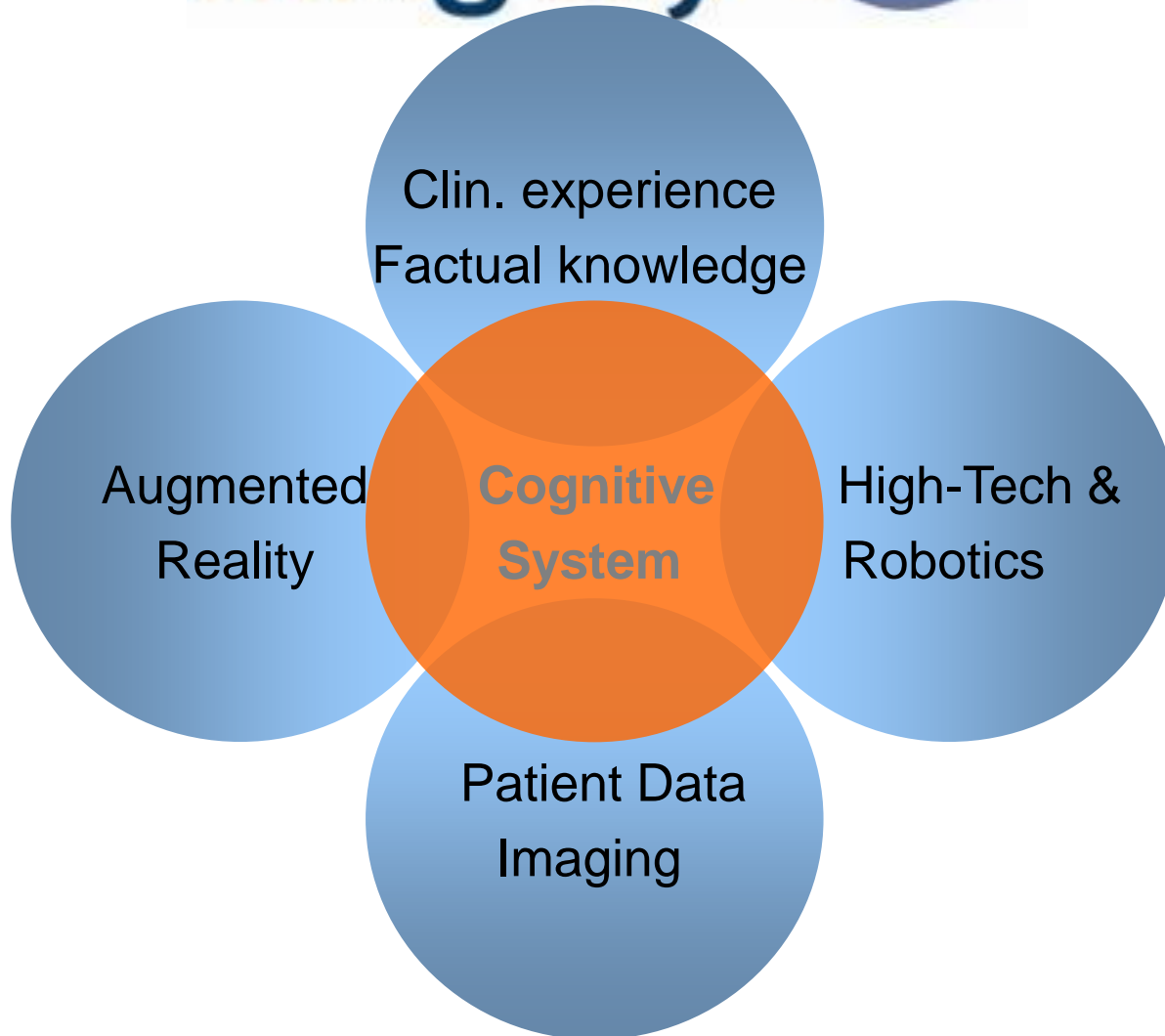
Computer-based, **integrated** system,
that

- Perceives information,
- Interprets information based on a knowledge base and
- Performs a context-sensitive action



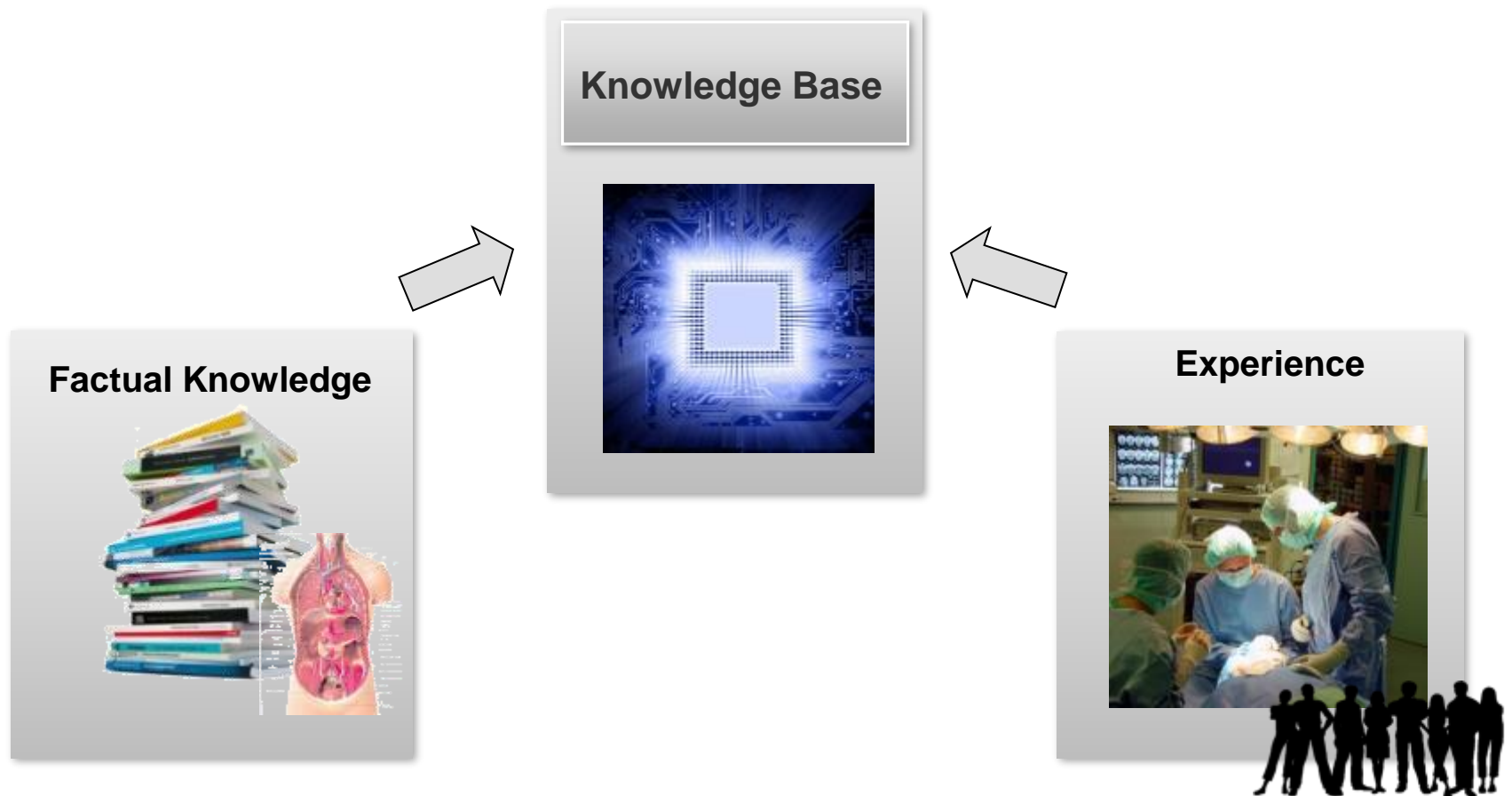


Cognition-Guided **Surgery**



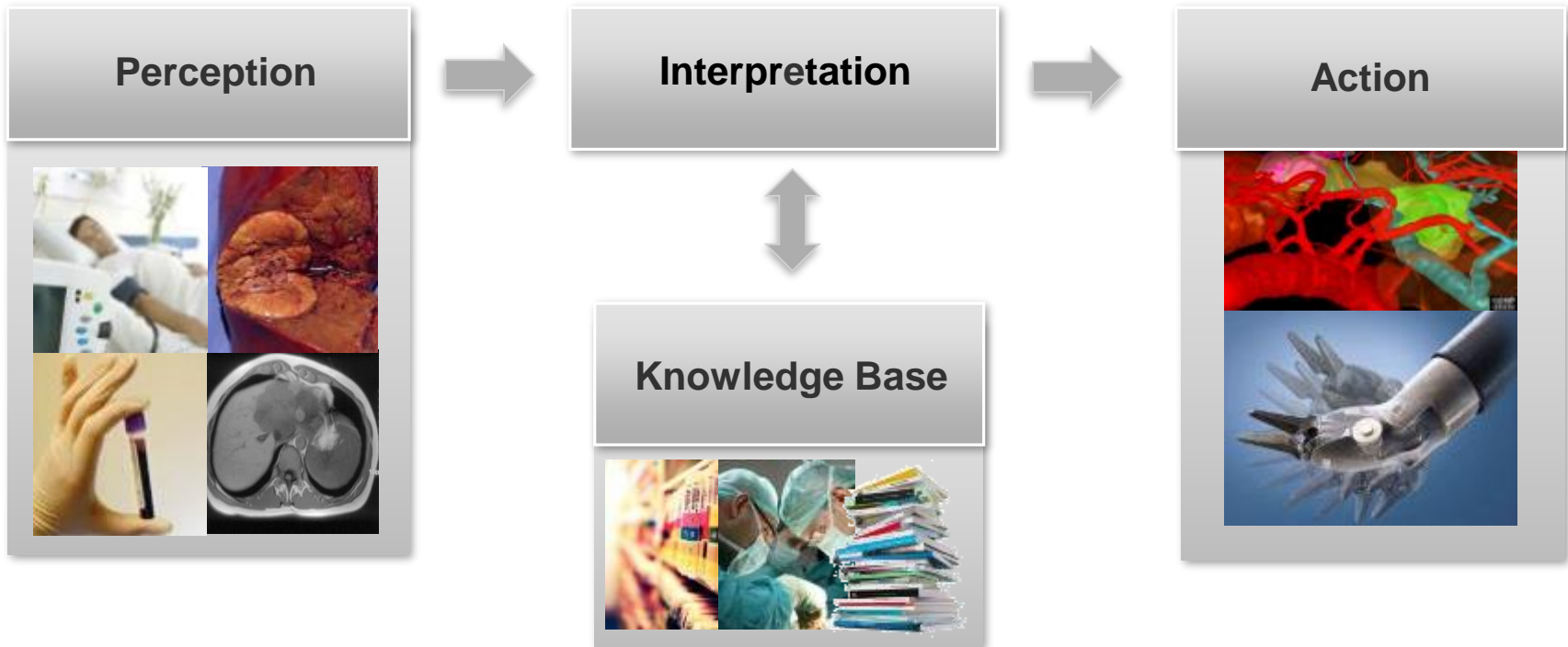


Cognition-Guided Surgery

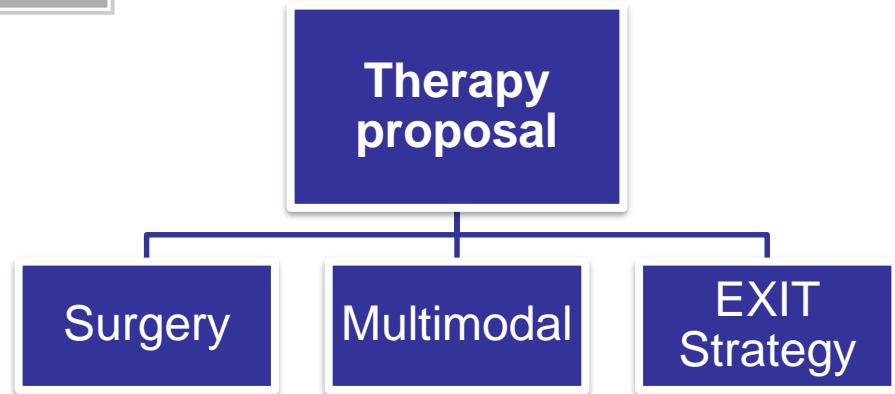
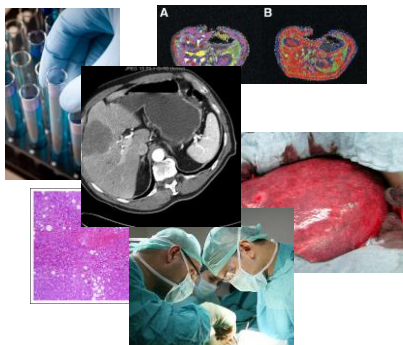
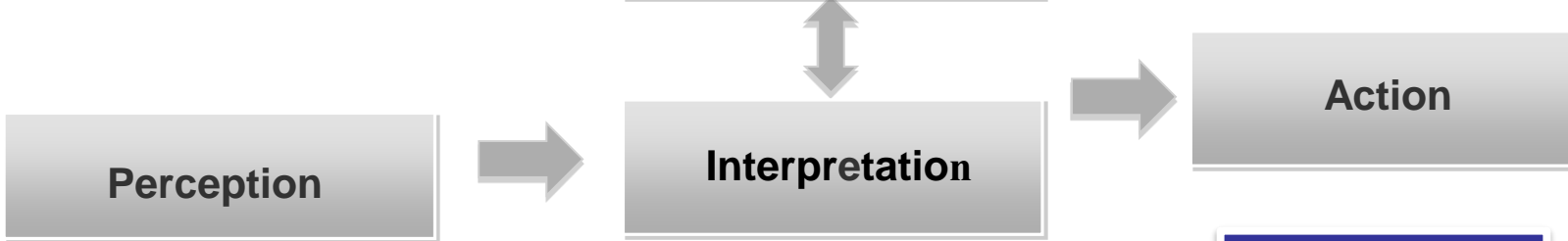
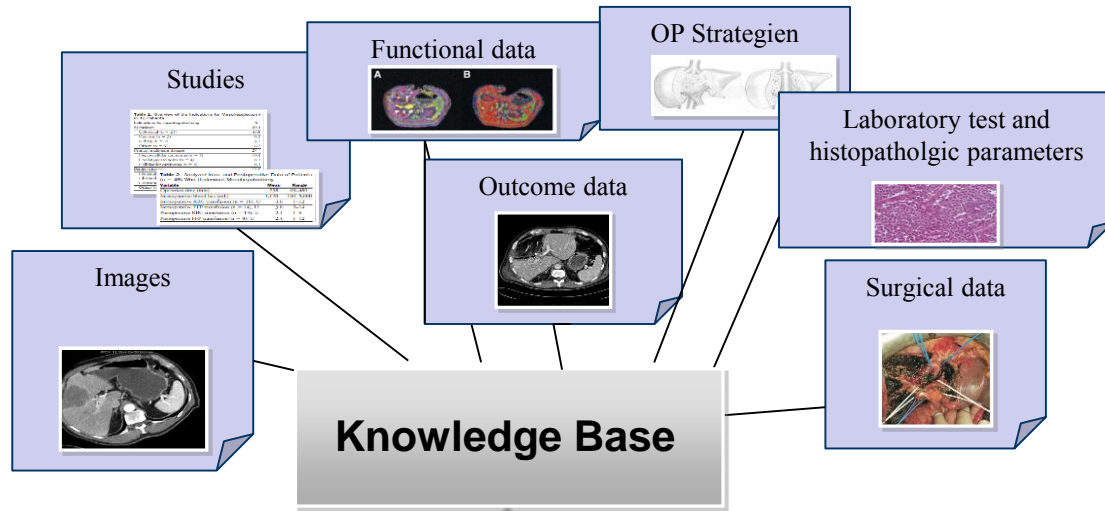




Cognition-Guided Surgery



Cognition-Guided Liver Surgery





Cognition-Guided Cholecystectomy





Cognition-Guided Camera-Guidance

Cognition-Guided
Surgery



A Learning Camera Robot for Laparoscopic Surgery Surgical Robot Challenge 2015

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Sebastian Bodenstedt
Stefanie Speidel
Heinz Wörn

Martin Wagner
Patrick Mietkowski
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Future Cognition-Guided Surgery?



However



Do not forget the patient!