

Data Visualization for Industry: Vis 4 Biz



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Introduction: Who is Bob?

- July 2006: Joined Computer Science Dept at Swansea University
- 2001-2006: Researcher at VRVis Research Center (VRVis.at)—the bridge between academia and industry in Austria
- 2001-2006: Software Engineer at AVL (www.avl.com), Department of Advanced Simulation Technologies (AST)
- 2005: PhD, Computer Science, Vienna University of Technology (TUWien)
- 2000: Msc., Computer Science, University of New Hampshire, Durham, NH
- 1997: BSc., Physics, University of Massachusetts (ZooMass), Amherst, MA
- Research in
 - Data visualization
 - Software Engineering
 - Human-computer interaction

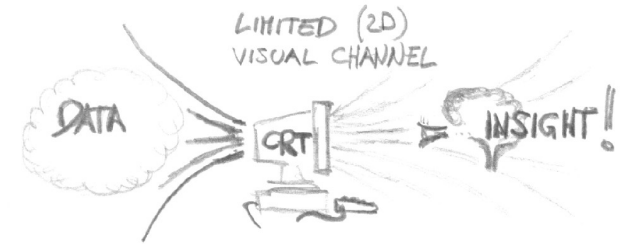
Vis 4 Biz: Motivation

- Does your business invest to collect and store vast quantities of complex data?
- Is your ability to derive information and knowledge from data as good as ability to collect it?
- Are you getting your full money's worth for your data?

Visualization: Why?

Visualization:

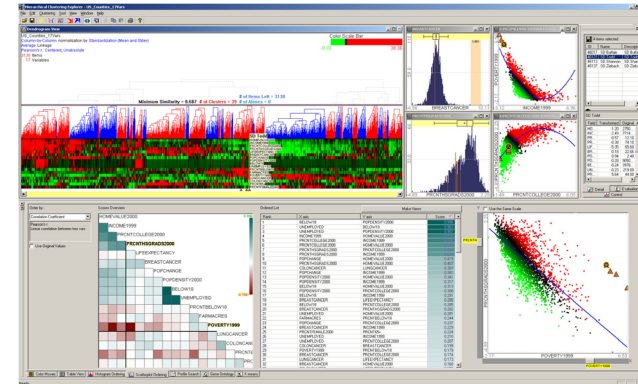
- Tool that allows user to gain insight large, complex data sets.
- Visualization enables user
 - to gain a fast overview of data,
 - explore,
 - find patterns and trends,
 - filter important from unimportant
 - detect features
- Most important information and knowledge is captured in a computer generated image.



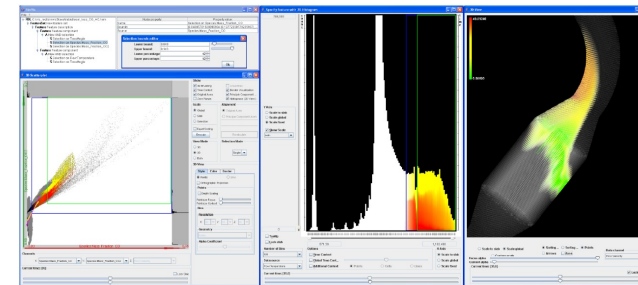
Visualization Strengths

Visualization is good for:

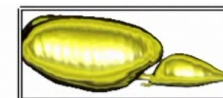
- Exploration
 - find the unknown, unexpected
 - hypothesis generation
- Analysis
 - confirm or reject hypotheses
 - information drill-down
- Presentation
 - communicate/disseminate results



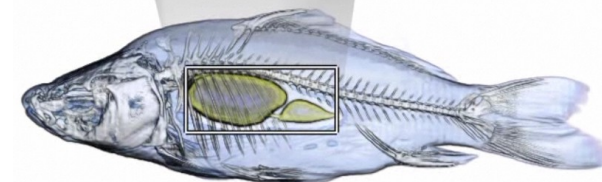
[Seo/Shneiderman 2004]



[Doleisch et al., 2003]

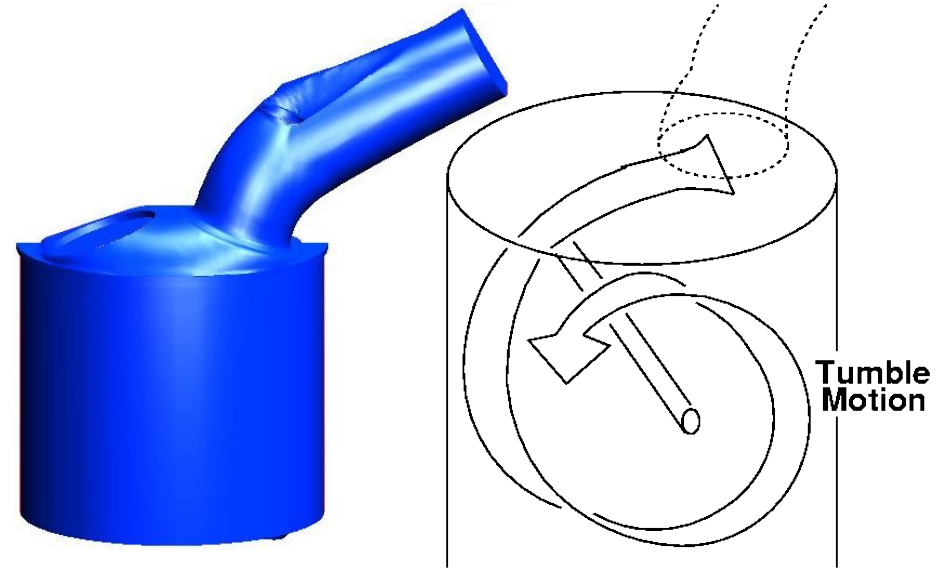
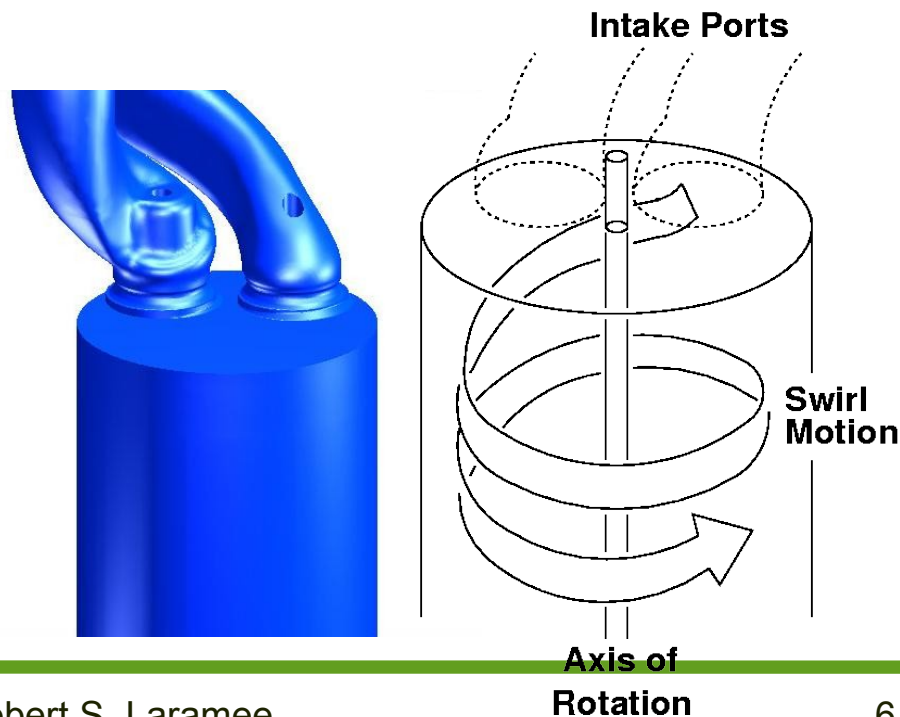


[Bruckner/
Gröller
2005]



Visualization: An Application

- **swirl motion:**
characterized by motion about cylinder-aligned axis
- more stable (easier)



- **tumble motion:**
characterized by motion about axis orthogonal to cylinder
- unstable, more difficult

Visualization: An Application

Achieving ideal patterns of motion leads to optimal mixing (of air and fuel) conditions

- e.g., higher exhaust/gas ratio (EGR)
- decrease in fuel consumption
- lower emissions

1. Can visualization provide insight into or verify characteristic shape/behavior of flow?
2. What tools help to visualize swirl/tumble motion?
3. Where (in the combustion chamber) are ideal ideal flow pattern **not** being realized?

Visualization: An Application

(Show video.)

Software Quality Laboratory



The Software Quality Laboratory belongs to the [Department of Computer Science](#) at [Swansea University](#).

Mission

The mission of the software quality laboratory is to increase our ability to develop high-quality, robust, and dependable software. We promote these goals through professional development of software engineers, quality education, research, and collaboration with industry and other practitioners. Our activities focus on

- foundations,
- software engineering,
- visualisation,
- testing, and
- verification.

Directors

- [Markus Roggenbach](#)
- [Robert S. Laramée](#)

Projects

- 2011/12: [Semantic Foundations of CSP](#), Research cooperation between Swansea University and Universidade Nova de Lisboa Portugal, sponsored by [Grid Tools](#).
- 2010/11: [Genetic Algorithms in Credit Card Fraud Detection](#), Final Year Project of Daniel Garner, cooperation between Swansea University and [Grid Tools](#).

Acknowledgment: The Software Quality Laboratory would like to thank Daniel Edem Kofi Klu for designing our logo.

[Markus Roggenbach](#) last update January 24, 2011.

■ <http://cs.swansea.ac.uk/SQL/>

Vis 4 Biz Summary

- Driven by strongest human sense
- Many applications
- Serves different purposes
 - Exploration, analysis, presentation
- Rapidly developing field
- Visit our new industry-lead initiative:
- <http://cs.swansea.ac.uk/SQL/>

Acknowledgements

- Thank you for your attention.
- For more information please Google “Robert S Laramée”
- Any Questions?

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