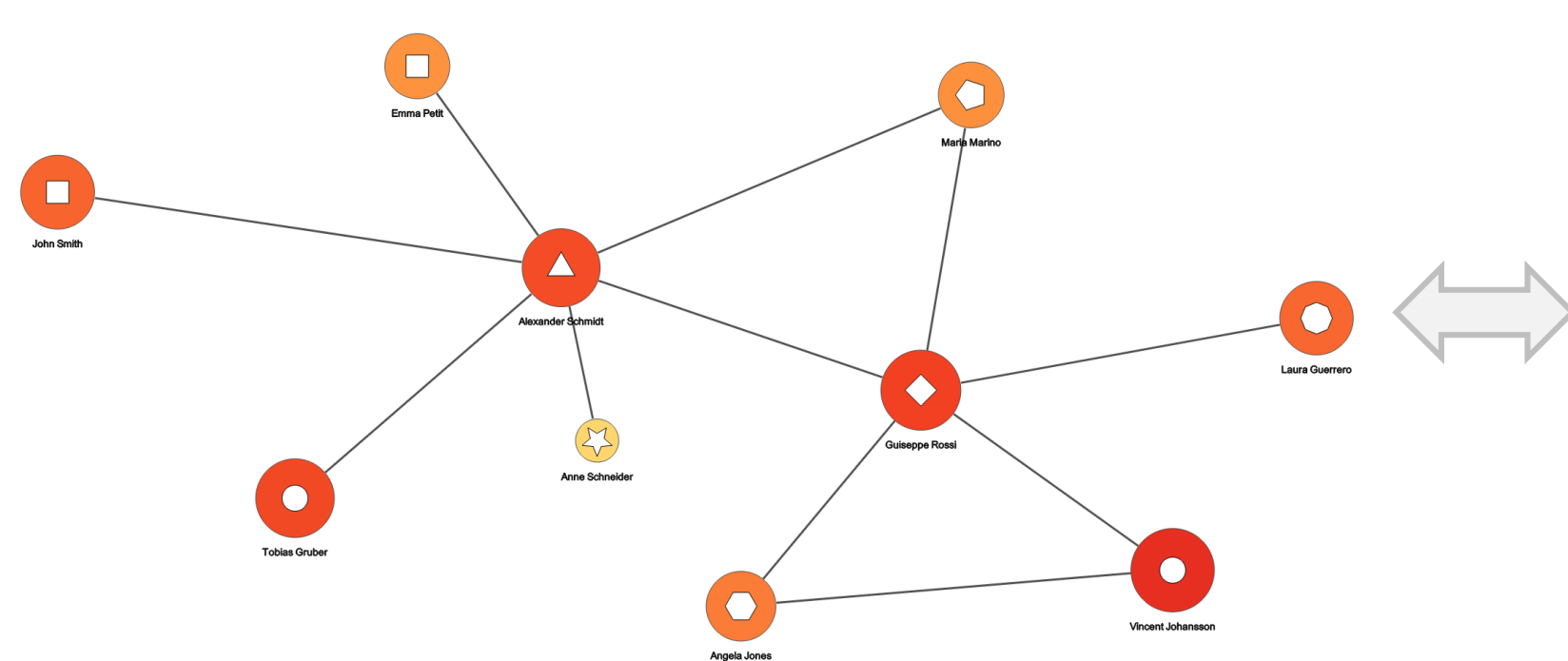


# Toward Integrated Exploration and Manipulation of Data Attributes in Graphs

Stefan Gladisch, Christian Tominski

Traditionally, exploration and manipulation are carried out in different tools

Data exploration tool



Data manipulation tool

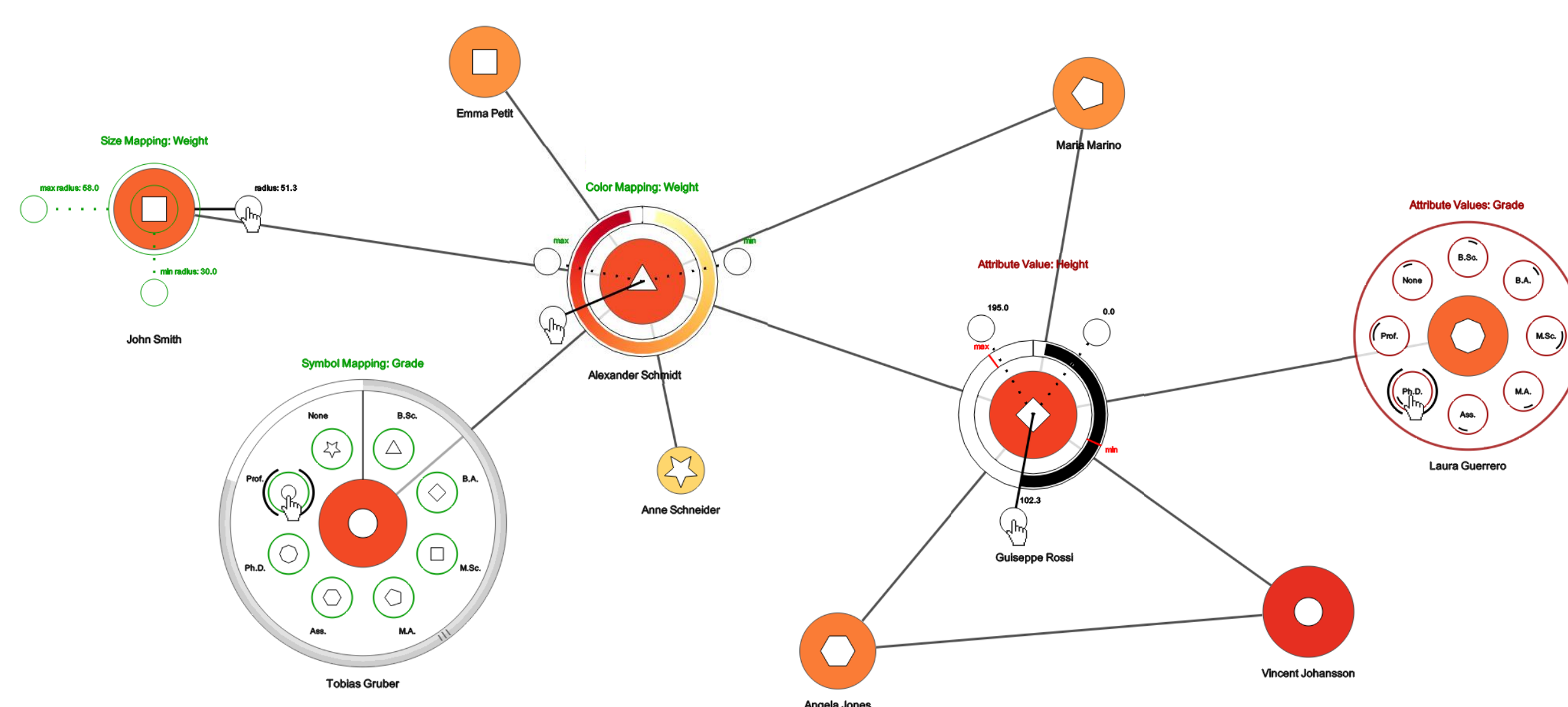
Name	Grade	Gender	Nationality	Height	ID	Relation
Alexander Schmidt	B.Sc.	Male	German	1.72 m	1	2, 3, 4, 6, 8
Anne Schneider	None	Female	German	0.51 m	2	1
Giuseppe Rossi	B.A.	Male	Italian	1.68 m	3	6, 7, 9, 10
John Smith	M.Sc.	Male	British	1.81 m	4	1

## Problems

- Context switches
- Different representations of the data
- Information distributed across views
- Inconsistent interaction

## Our approach supports integrated exploration and manipulation by combining node-link diagrams with radial menus and novel user controls

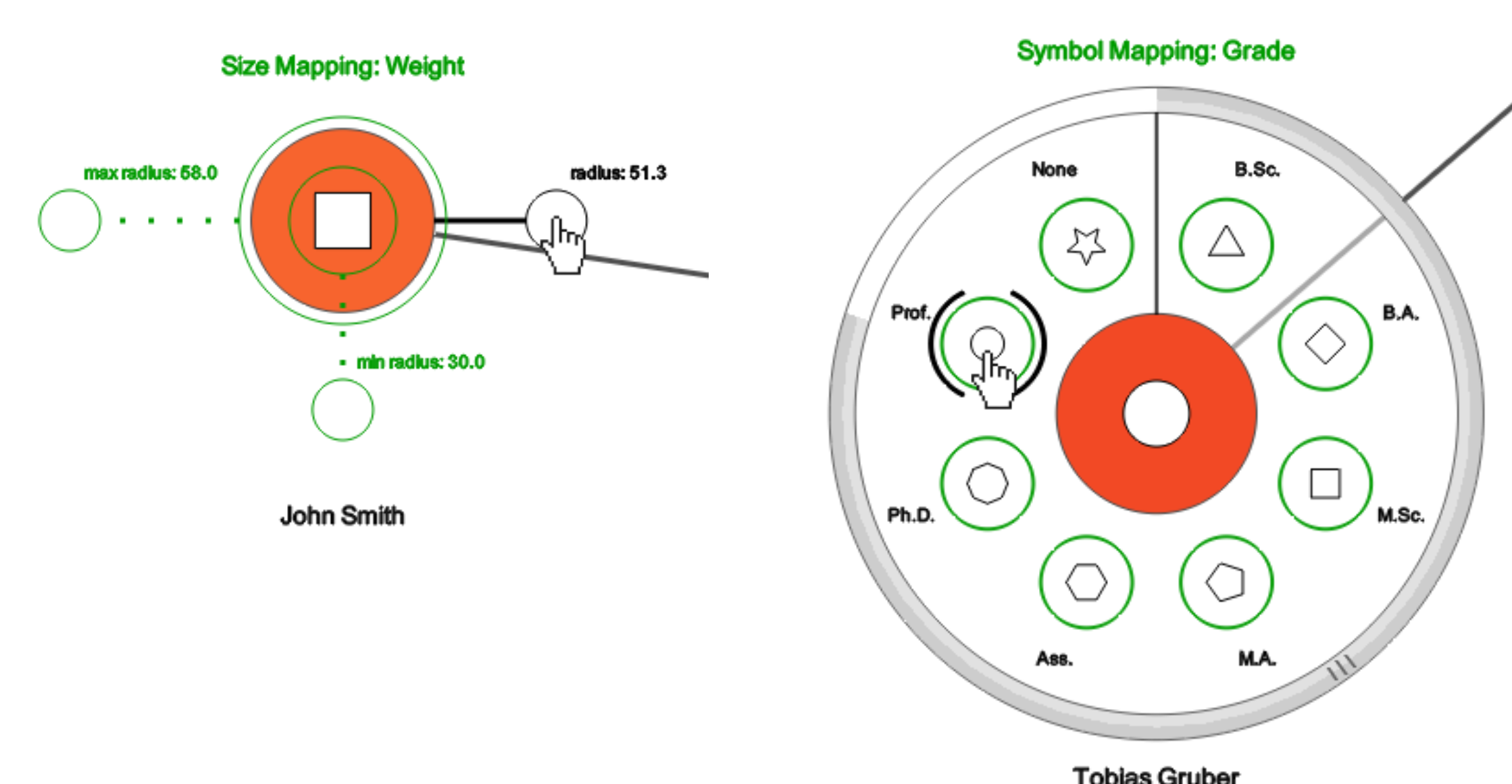
Integrated data exploration and manipulation tool



## Benefits

- **No context switches**
- **Coherent representation of the data**
- **Information always at hand**
- **Consistent interaction**

Exploration task:  
*Change visual encoding*



Manipulation task:  
*Change data values*

