

Multidisciplinary nature of work with reference to PIs and ICs within a portfolio

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User: IC

Insight Need: Who is conducting multidisciplinary science

Data: NIH grants data in csv format

Analysis: Directed network analysis

Workflow:

1. Load the data as standard csv file with columns for performing unit (e.g., IC, PI, institution) and topic terms (e.g., RCDC terms).

	A	B
1	PI Name	Topic Terms
2	J. Smith	Brain; Cancer
3	...	

2. Extract bimodal network using *Data Preparation > Text Files > Extract Directed Network* with Source Column *performing unit*, Target Column *topic terms*, and Text Delimiter (e.g., ; or |).
3. Get simple network statistics by running *Analysis > Networks > Network Analysis Toolkit*.
 - a. If there are *too many nodes*, extract giant component by running *Analysis > Networks > Unweighted and Directed > Weak Component Cluster*.
 - b. If there are too many isolated (unconnected nodes) run *Preprocessing > Networks > Delete Isolates*. Select resulting small network in Data Manager and visualize it in GUESS.
4. In this directed bimodal network, arrows run from performing unit to topic term(s). The indegree (number of arrows pointing to a node) and outdegree (number of arrows originating at a node) can be used to identify the node type. Calculate the node degrees by running *Analysis > Networks > Unweighted and Directed > Node Indegree* and *Analysis > Networks > Unweighted and Directed > Node Outdegree*.
5. To view the network, select the (largest component of the) network in Data Manager and visualize it in GUESS. Use *Layout > GEM* and pack nodes into available display space using *Layout > BinPack*.
6. To color code the nodes to distinguish ICs/PIs and RCDC categories, select the option in the information window for “nodes based on”, then select “indegree” and the “Value” that you would like to be displayed. Use the color option to color code ICs/PIs. To color RCDC categories select “Nodes size” option and “outdegree” option followed by specifying a range of values and color to identify the categories.

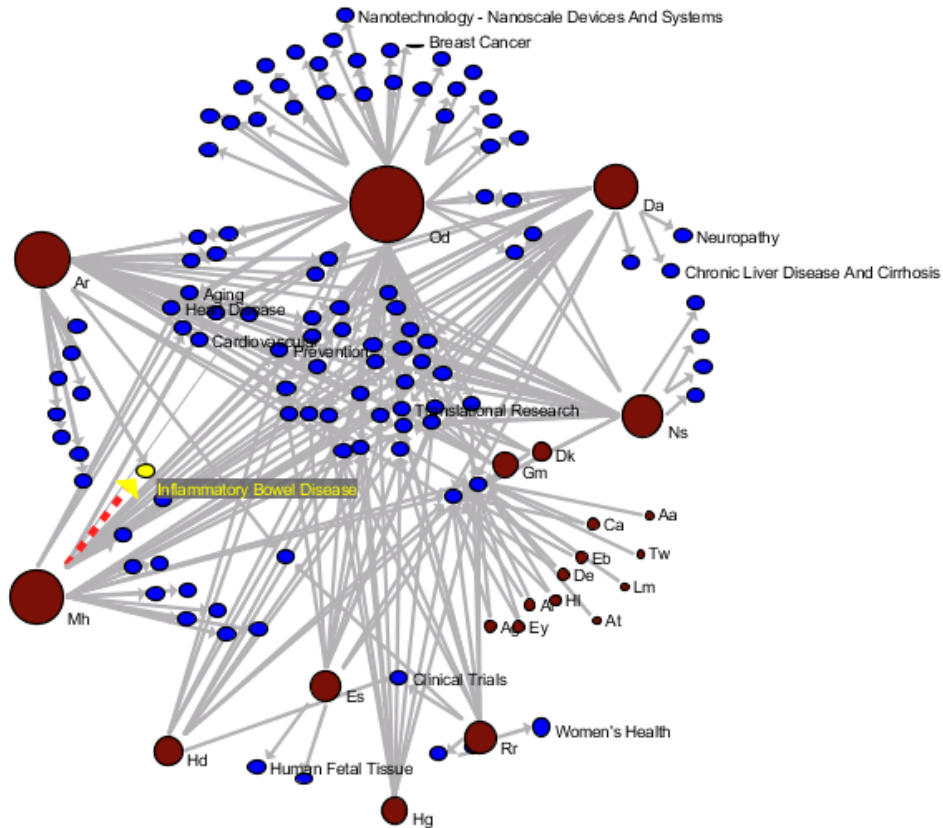


Fig 1: Directed Network of IC versus RCDC categories for a particular portfolio. Red circles indicate the ICs and the blue circles are for RCDC categories. The size of the red circles indicate the number of categories (outdegree) for that IC.

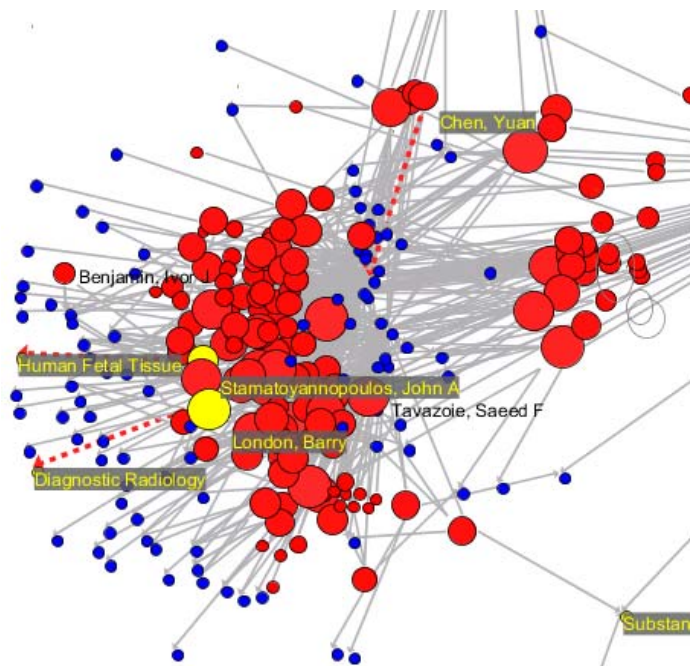


Fig 2: Directed Network of PIs and RCDC categories for a particular portfolio to understand multidisciplinary nature of their work. Red circles indicate the PI and the blue circles are for RCDC categories. The larger the size of the red circles the more multidisciplinary the projects are.