

Diffusion: Measuring the Impact of Scientific Research Within and Outside a Field

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Integration: A Prelude to Diffusion

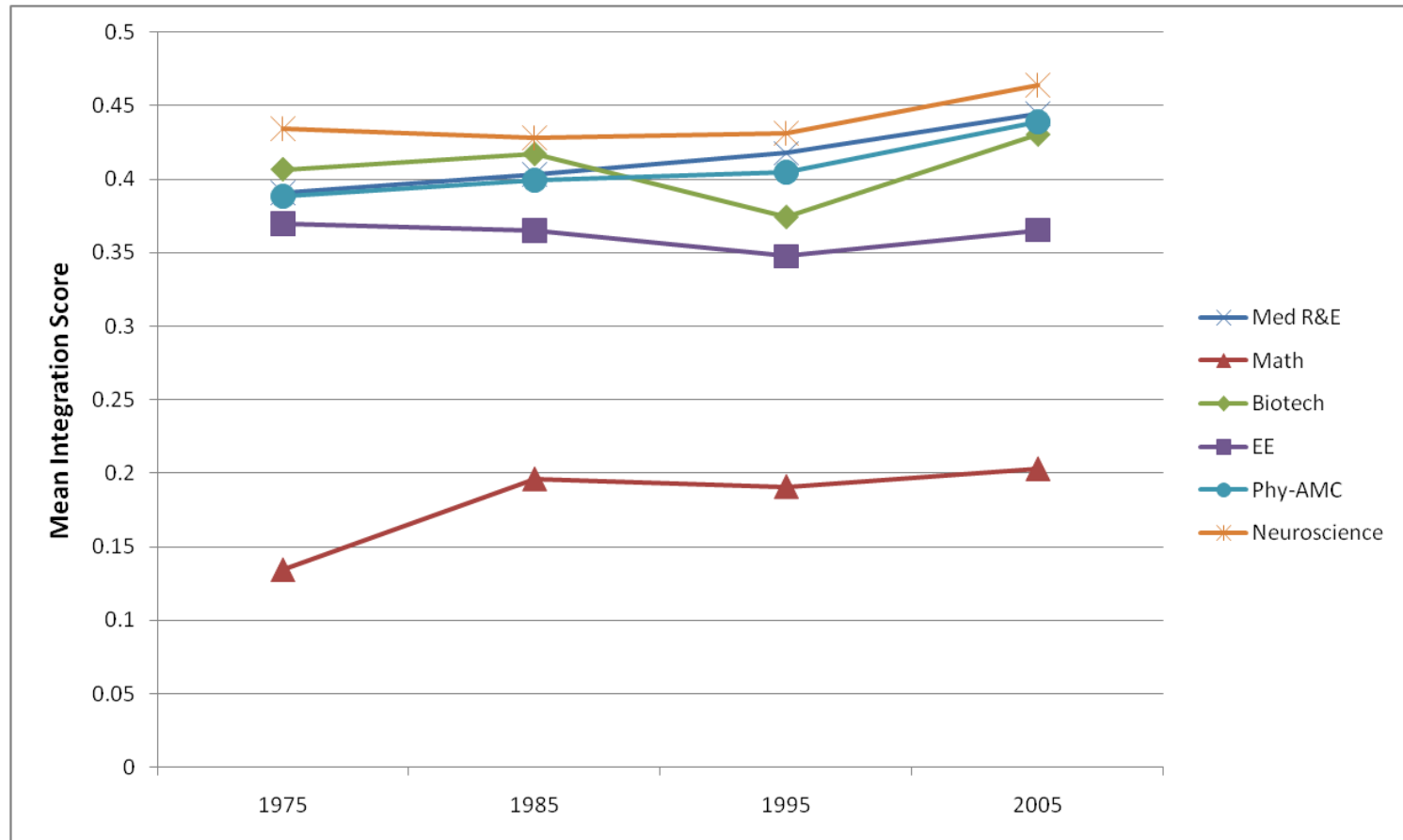
- Integration Defined:

$$I = 1 - \left[\frac{[\sum (f_i \times f_j \times \cos(sc_i - sc_j))]}{\sum (f_i \times f_j)} \right]$$

where I = row, j = column, f = frequency

- Integration Range
- Integration Examples

Changes in Average Integration Scores over Time

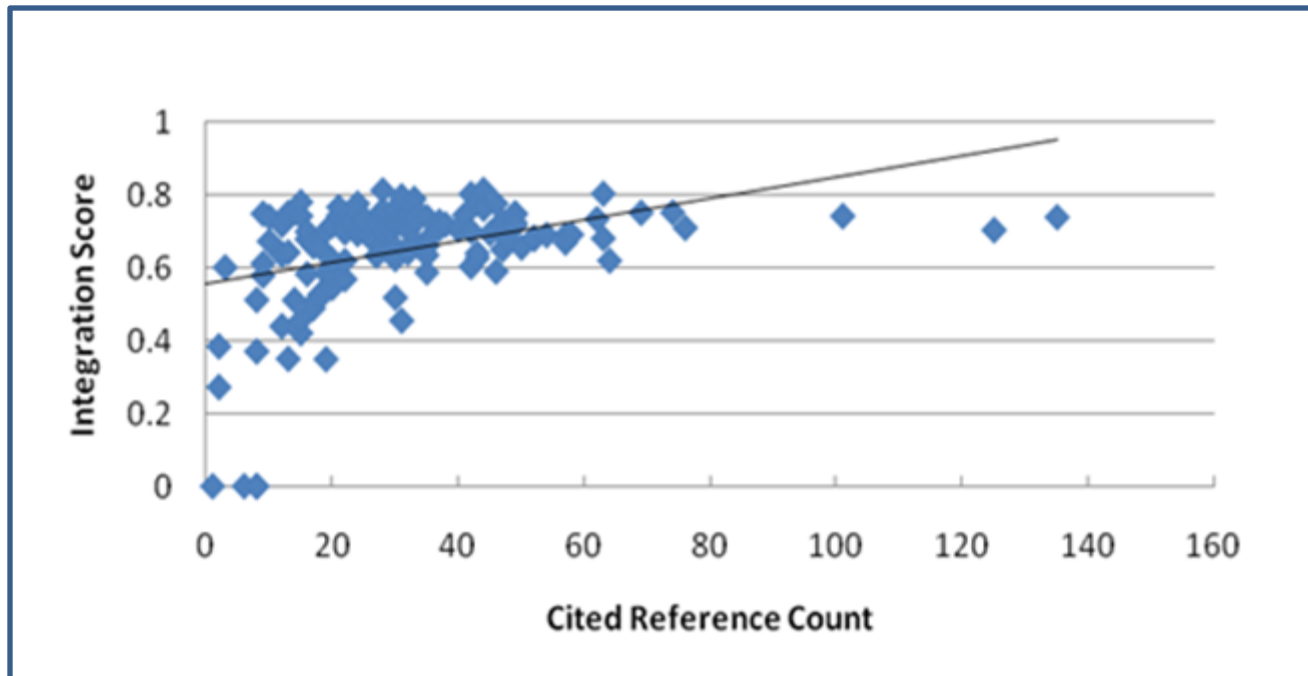


Citation: Porter, Alan, and Ismael Rafols. "Is science becoming more interdisciplinary? Measuring and mapping six research fields over time." *Scientometrics*. 81.3 (2009): 719-745.

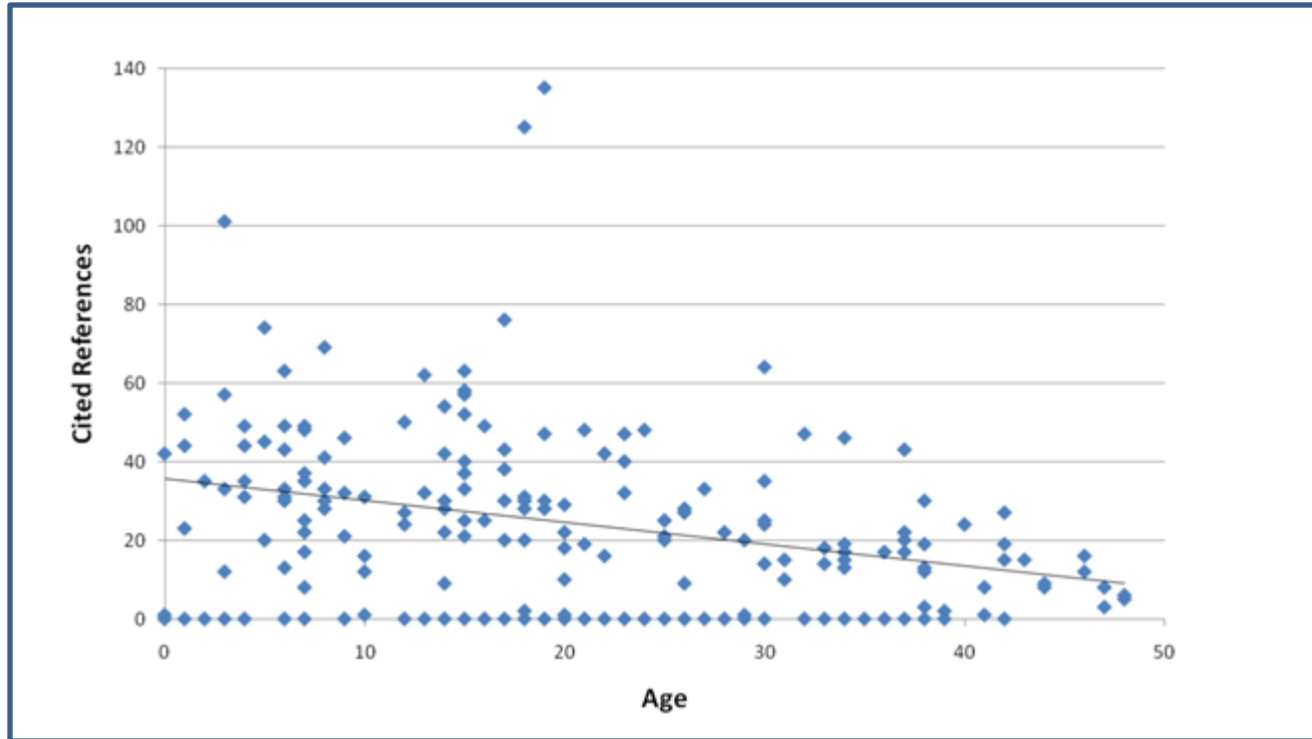
Taking a Look at the Research of Dr. Robert Nerem

- Institute Professor Emeritus and Director,
Georgia Tech/Emory Center for Regenerative
Medicine
- 240 Web of Science (WOS) publications, in
- 76 Journals, over
- 47 Years, and more than
- 8,000 Citations

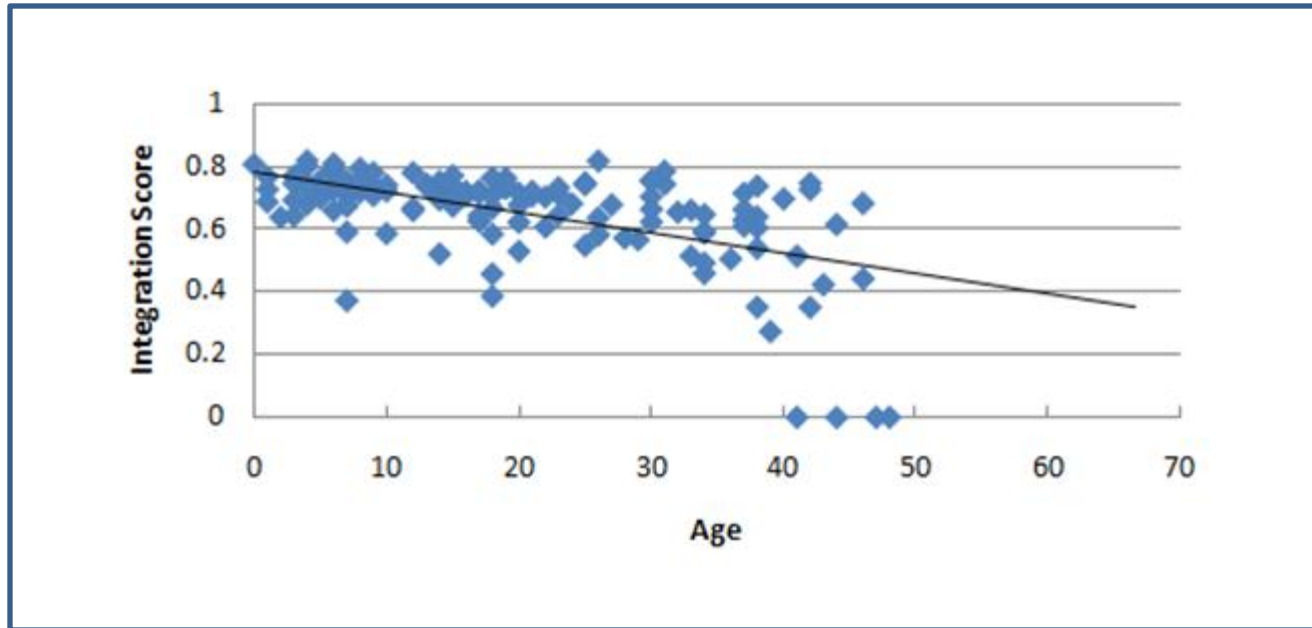
Integration Scores v. Cited Reference Counts for Dr. Nerem's Research



Cited Reference Counts v. Publication Age for Dr. Nerem's Research



Integration Scores v. Publication Age for Dr. Nerem's Research



For more on Integration see:

- Porter, Alan, Alex Cohen, David Roessner and Marty Perreault. "Measuring researcher interdisciplinarity." *Scientometrics*. 72.1 (2007): 117-147.
- Porter, Alan, David Roessner, and Anne Heberger. "How interdisciplinary is a given body of research?" *Research Evaluation*. 17.4 (2008): 273-282.
- Porter, Alan, and Ismael Rafols. "Is science becoming more interdisciplinary? Measuring and mapping six research fields over time." *Scientometrics*. 81.3 (2009): 719-745.

Diffusion Scoring

- Diffusion Defined
- Diffusion Range
- Chen: papers which are cited quickly and diffusely are more likely to be hits

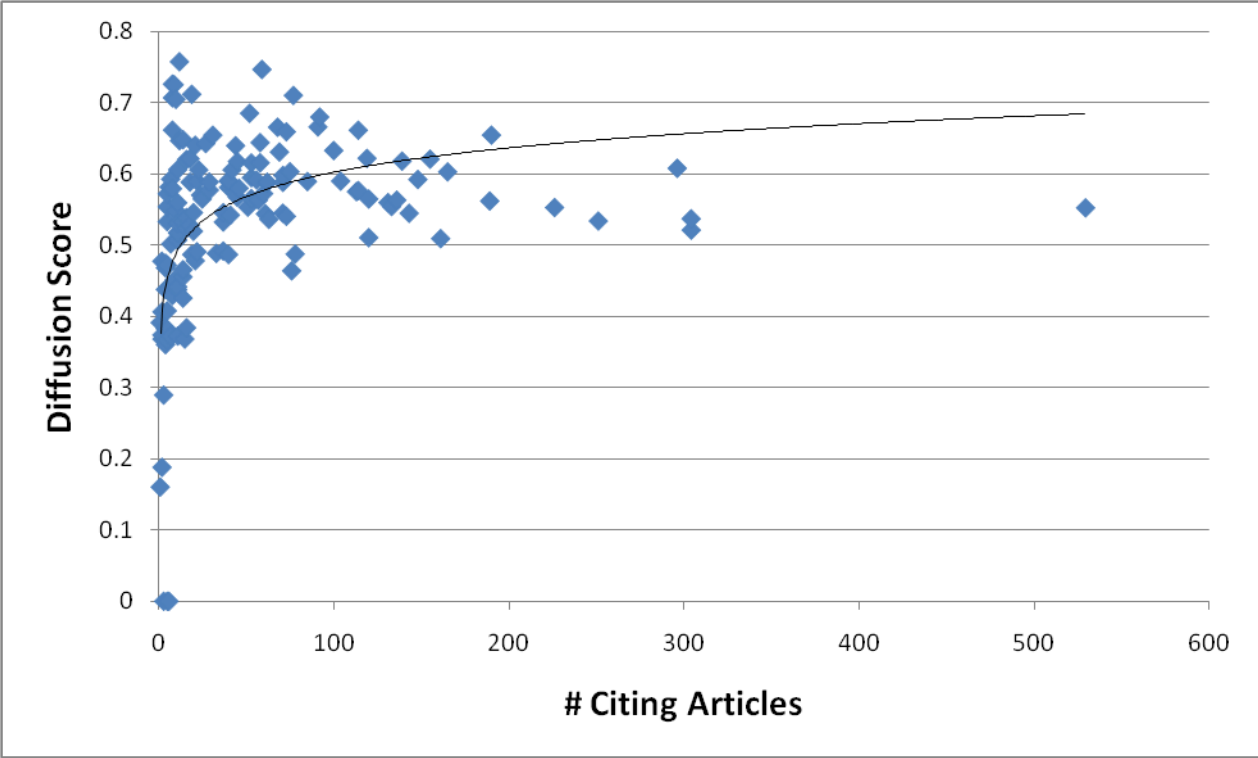
Citation: Chen, Chaomei, and Diana Hicks. "Tracing knowledge diffusion." *Scientometrics*. 59.2 (2004): 199-211.

Diffusion Scoring Example

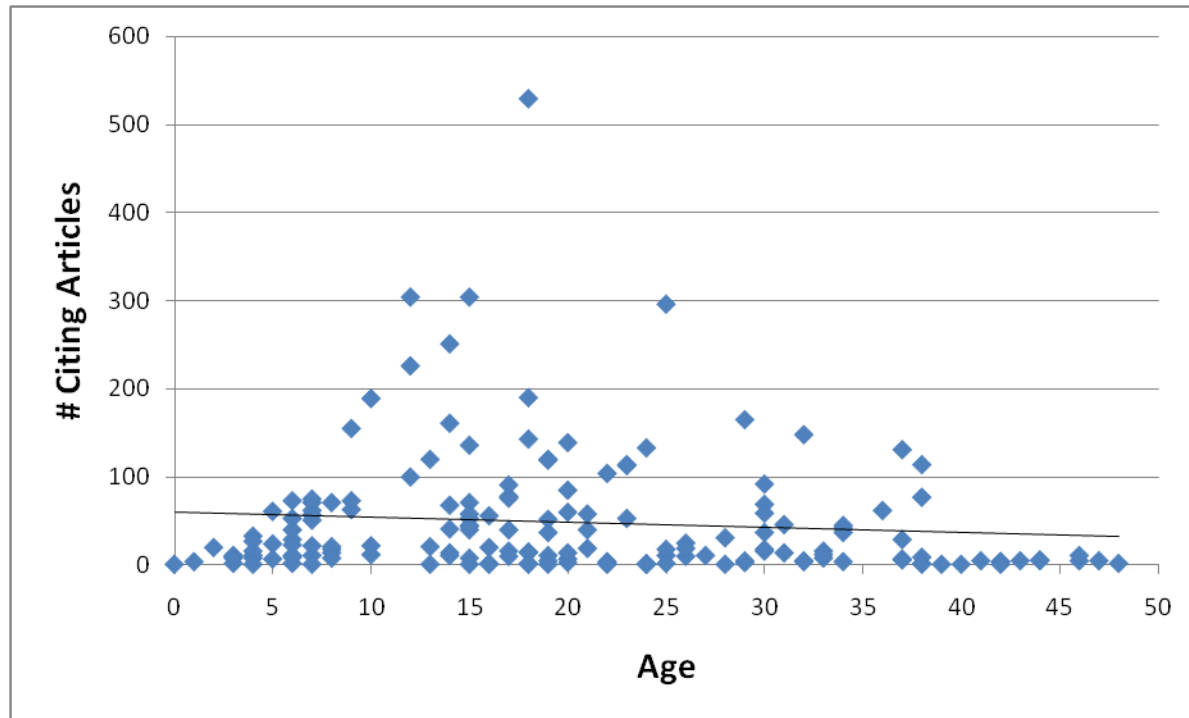


- In the example above Paper 2 will have a higher diffusion score than Paper 1 because there is greater heterogeneity among its citing subject categories.
- Chen: because Paper 2 diffuses more broadly it is more likely to be a hit.

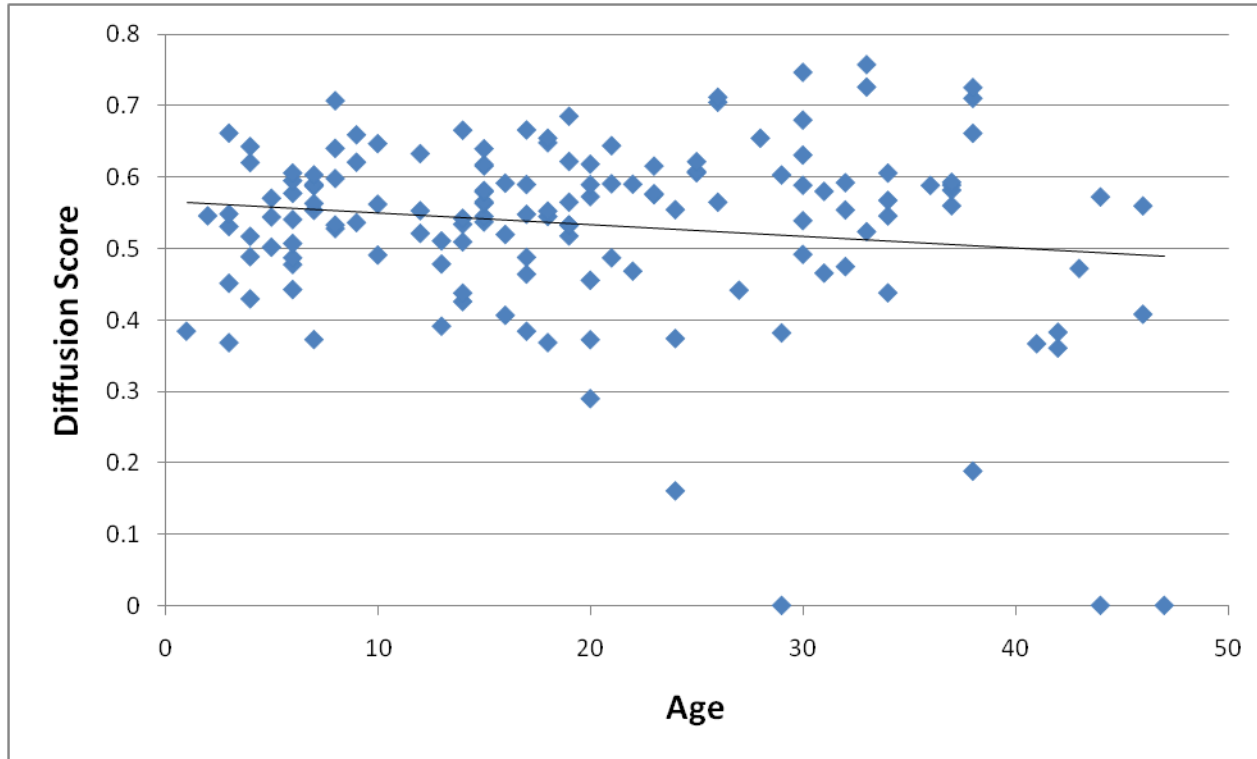
Diffusion Scores v. # Citing Articles for Dr. Nerem's Research



Citing Articles v. Publication Age for Dr. Nerem's Research



Diffusion Scores v. Publication Age for Dr. Nerem's Research



For more on Diffusion see:

- Chen, Chaomei, and Diana Hicks. "Tracing knowledge diffusion." *Scientometrics*. 59.2 (2004): 199-211.
- Porter, Alan, and Stephen Carley. (2010) "A Forward Diversity Index." Forthcoming.

Thank you