

Ethics for Scientists PHY 280

The Sames and Sezen Case

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May 18, 2007





Outline

- How the news broke
- What questions were raised
- What lessons can be learned



The story goes...



Prof. Dalibor Sames
Department of Chemistry
Columbia University



Dr. Bengu Sezen
Former student of Sames Group
Current PhD Student at University
of Heidelberg, Germany



<http://www.zmbh.uni-heidelberg.de/Schiebel/members.shtml>


Seven papers published in 2002-2005

1. Sezen, B. and D. Sames (2005). "Selective and catalytic arylation of N-phenylpyrrolidine: $sp(3)$ C-H bond functionalization in the absence of a directing group." Journal of the American Chemical Society 127(15): 5284-5285.
2. Bodula, K., B. Sezen, et al. (2005). "Site-specific arylation of pyridine catalyzed by phosphido-bridged ruthenium dimer complexes: A prototype for C-H arylation of electron-deficient heteroarenes." Journal of the American Chemical Society 127(11): 3648-3649
3. Sezen, B. and D. Sames (2004). "Oxidative C-arylation of free (NH)-heterocycles via direct ($sp(3)$) C-H bond functionalization." Journal of the American Chemical Society 126(41): 13244-13246.
4. Sezen, B. and D. Sames (2003). "Selective C-arylation of free (NH)-heteroarenes via catalytic C-H bond functionalization." Journal of the American Chemical Society 125(18): 5274-5275.
5. Sezen, B. and D. Sames (2003). "Diversity synthesis via C-H bond functionalization: concept-guided development of new C-arylation methods for imidazoles." Journal of the American Chemical Society 125(24): 6058-6059.
6. Sezen, B. and D. Sames (2003). "Cobalt-catalyzed arylation ofazole heteroarenes via direct C-H bond functionalization." Organic Letters 5(20): 3607-3610.
7. Sezen, B., R. Franz, et al. (2002). "C-C bond formation via C-H bond activation. Catalytic arylation and alkenylation of alkane segments." Journal of the American Chemical Society 124(45): 13372-13373.

Retracted in Mar 8, 2006

Retracted in June 22, 28 2006





- 7/8 papers published by Sezen and Sames during 2001 – 2005 were retracted

- 6/7 papers Sezen and Sames were the only two authors

■ **Retraction statement:**

“ After the departure of the first author, the laboratory of the corresponding author (D. Sames) has been unable to reproduce the key results in this publication. Accordingly, the corresponding author withdraws this paper, and deeply regrets that the chemical community was misled by its publication.”





- C-H bond: ubiquitous and strong
- C-H activation: tremendous opportunities in applications such as pharmaceuticals, biological probes

Kamil Godula, Dalibor Sames. C-H Bond Functionalization in Complex Organic Synthesis *Science* 312, 67 (2006)

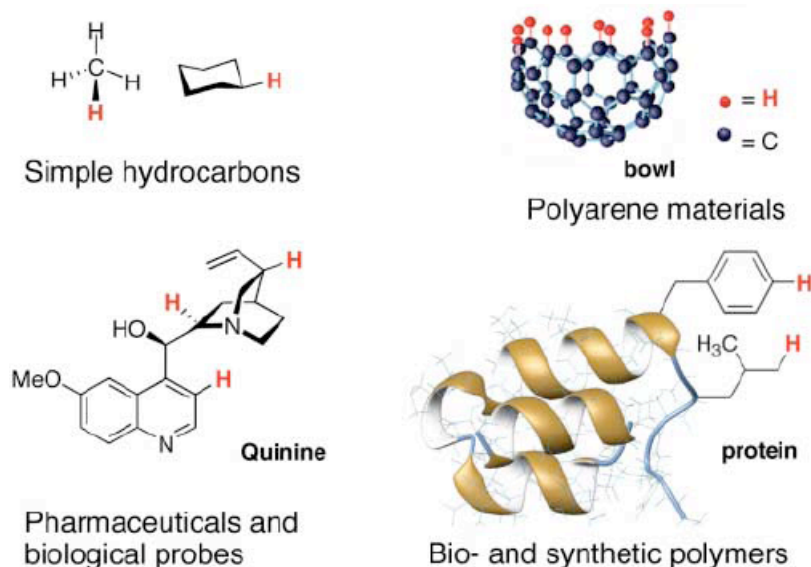


Fig. 1. C-H bonds are found in nearly all organic compounds. C-H bond functionalization will influence the broad field of chemical synthesis. Hydrogen atoms in red designate examples of different C-H bonds in diverse organic compounds.

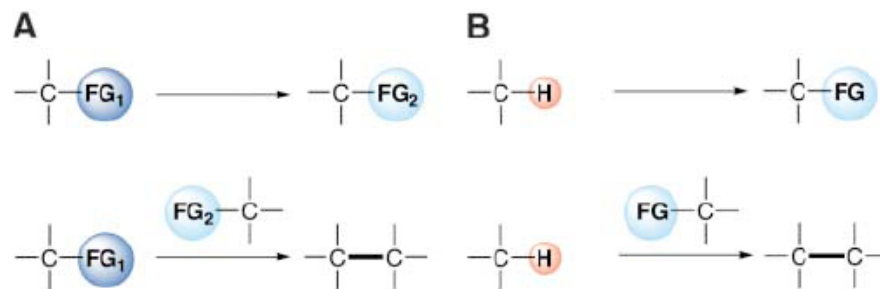


Fig. 2. (A) Traditional approach to organic synthesis by means of functional group (FG) transformation. (B) Synthesis by means of C-H bond functionalization.

More about Dr. Sames

- March, 2003: Associate Professor of Chemistry
Department of Chemistry Columbia University, New York
- July, 1998: Assistant Professor of Chemistry
Department of Chemistry Columbia University, New York
- March, 1996 - June 1998: Irvington Institute
Postdoctoral Fellow Bioorganic Laboratory, Memorial
Sloan-Kettering Cancer Center, New York (*Prof. S. J.
Danishefsky, Director*)
- August, 1991 - December, 1995: Graduate Research
Assistant Department of Chemistry, University of
Arizona (*Prof. R. L. Polt, Advisor*)
- January, 1987- October, 1990: Undergraduate Research
Associate Institute of Organic Chemistry and
Biochemistry of Czech Academy of Sciences in Prague,
Czech Republic (*Drs. V. Pouzar, P. Drasar, Advisor*)

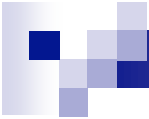


Science 17 March 2006:

CHEMISTRY: Columbia Lab Retracts Key Catalysis Papers

- "These were definitely important papers" - Justin Du Bois, synthetic chemist at Stanford University in California
- "She has done some good things and made an impact on the field" - Benjamin Lane, chemist with the pharmaceutical company Biogen in Cambridge, Massachusetts, a former Sames group member



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- "Professor Dalibor Sames or anyone else from Columbia University did not contact me regarding the retractions"
 - Bengu Sezen, now PhD student in molecular biology at University of Heidelberg, Germany



Media Coverage

- Mar 15: **Chemical and Engineering News** - Researcher Withdraws JACS Papers: Flagship journal of the American Chemical Society may have published results that cannot be reproduced
- Mar 16: **The New York Times** - Professor at Columbia Retracts Papers Over Research Questions; **United Press International** - Columbia University retracts three papers
- Mar 17: **Science** - Columbia Lab Retracts Key Catalysis Papers
- Mar 18: **The New York Times** - Ex-Columbia Student Says Disputed Chemistry Research Is Sound
- Mar 23: **Nature** - Chemists Shrug off unseemly spotlight; **C&EN** - Researcher Responds to Retraction of Papers: Former Columbia PhD student claims her work has been reproduced
- Apr 4: **Columbia Daily Spectator** - Columbia Chemist Retracts Two Papers, Part of Third: Discussion of research misconduct policy amplified as investigation continues, University remains mum on topic
- Jun 1: **Columbia Daily Spectator** - Researcher Retracts Four More Papers: Dalibor Sames' laboratory under fire
- Jun 15: **C&EN** - Sames Retracts More Papers: Columbia U. professor publishes notices that former grad student's work cannot be reproduced
- Jun 15: **The New York Times** - Columbia Chemistry Professor Is Retracting 4 More Papers
- Jun 19: **Science** - Columbia Lab Issues Four Additional Retractions



What questions were raised

■ Who, if any, benefited?



- Dr. Sezen ?
- Dr. Sames ?
- Columbia University
- J.Am.Chem.Soc.
- Organic chem. community
- Media



What Questions were raised

- "Why are biologists the only scientists being exposed as frauds? Why are the organic chemists who chose the unethical route hidden from scrutiny?"
- "Can someone explain to us what is really going on (between Sames and Sezen)?"
- "Should professors supervising graduate students in chemistry be more vigilant in monitoring what is going on in their labs and making sure our chemistry research is not tainted by students who are not careful in recording their findings in lab notebooks?"
- *"if you are the student that follows and you're incompetent, wouldn't it be easy to say the previous student (especially if she's gone) falsified data? "*
- "Did Sezen's graduate coursework include a required course in science ethics? What about her undergraduate degree? Did she attend workshops offered by the ACS at a national or local meeting? Does the ACS offer such workshops?"
- "How many multi-paper retractions from a prestigious university do you think the general public needs to start doubting the entire field of chemistry?"



Debates are still going on

- Was there a data fabrication problem? What responsibility should Dr. Sames take?
- Dr. Sames had fired five people who failed to reproduce the results
- Dr. Sezen : "I preserve copies of experimental data which supports the original claims of these publications... I am also prepared to perform the reactions under supervision of Prof. Sames" ---NYT



Debates are still going on

- **Was there a data fabrication problem? What responsibility should Dr. Sames take?**

“ In modern collaborative research, the implications of academic misconduct or fraud go far beyond the individual; they also affect collaborators whose own work has been committed to objective search for truth. The specter of guilt by association may lurk in the background for many years to come. Therefore, joint authorship requires joint responsibility; each author claiming credit for the entire work must also be aware of joint discredit. Investigators in collaborative research projects each must make reasonable and periodic inquiry as to the integrity of and processes involved in gathering and evaluating data. **It should be understood that overall responsibility for the integrity of collaborative research rests with the principal investigator.** Senior investigators cannot be allowed to escape the consequences of the discovery of misconduct or fraud committed under their supervision.

- ***Columbia's Statement on Professional Ethics and Faculty Obligations and Guidelines for Review of Professional Misconduct***

http://www.columbia.edu/cu/vpaa/fhb/app/app_e.html



Debates are still going on

- Was the unilateral retraction ethical? How would it be treated differently in other science communities?

" Every member of the faculty has a duty to respond promptly to any well-founded suspicion of academic misconduct or fraud. Allegations must be made with caution; nevertheless, the results of long-standing misconduct or fraud are so devastating that potential irregularities must be brought promptly to the attention of the proper authorities. **At the same time, the rights of those whose research procedures or results are in question from the standpoint of possible falsification or adulteration must be carefully protected while a careful and fair investigation is being carried out.**"

- *Columbia's Statement on Professional Ethics and Faculty Obligations and Guidelines for Review of Professional Misconduct*



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"Retraction is a very significant step, which implies that misconduct has occurred. An accusation by one author, no matter how senior, against another is not proof of misconduct, and everyone is entitled to respond to an accusation." - Martin Blume, APS Editor-in-Chief

<http://www.aps.org/publications/apsnews/200608/ethics.cfm>



What lessons can be learned

Table 1 | Percentage of scientists who say that they engaged in the behaviour listed within the previous three years (n = 3,247)

Top ten behaviours	All	Mid-career	Early-career
1. Falsifying or 'cooking' research data	0.3	0.2	0.5
2. Ignoring major aspects of human-subject requirements	0.3	0.3	0.4
3. Not properly disclosing involvement in firms whose products are based on one's own research	0.3	0.4	0.3
4. Relationships with students, research subjects or clients that may be interpreted as questionable	1.4	1.3	1.4
5. Using another's ideas without obtaining permission or giving due credit	1.4	1.7	1.0
6. Unauthorized use of confidential information in connection with one's own research	1.7	2.4	0.8 ***
7. Failing to present data that contradict one's own previous research	6.0	6.5	5.3
8. Circumventing certain minor aspects of human-subject requirements	7.6	9.0	6.0 **
9. Overlooking others' use of flawed data or questionable interpretation of data	12.5	12.2	12.8
10. Changing the design, methodology or results of a study in response to pressure from a funding source	15.5	20.6	9.5 ***
Other behaviours			
11. Publishing the same data or results in two or more publications	4.7	5.9	3.4 **
12. Inappropriately assigning authorship credit	10.0	12.3	7.4 ***
13. Withholding details of methodology or results in papers or proposals	10.8	12.4	8.9 **
14. Using inadequate or inappropriate research designs	13.5	14.6	12.2
15. Dropping observations or data points from analyses based on a gut feeling that they were inaccurate	15.3	14.3	16.5
16. Inadequate record keeping related to research projects	27.5	27.7	27.3

Note: significance of χ^2 tests of differences between mid- and early-career scientists are noted by ** ($P < 0.01$) and *** ($P < 0.001$).

What lessons can be learned

- Data integrity
- Co-authorship
- Mentor-Student relationship
- Publication and retraction

The Chemist's Code of Conduct

-Adopted by American Chemical Society in 1994

<http://www.chemistry.org/portal/a/c/s/1/acdisplay.html?DOC=membership%5Cconduct.html>





Thank you

