

## Altmetrics, Legacy Scholarship, and Scholarly Legacy

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When using alternative metrics (altmetrics) to investigate the impact of a scholar's work, researchers and librarians are typically cautioned that altmetrics will be less useful for older works of scholarship. This is because it is difficult to collect social media and other attention retroactively, and the numbers will be lower if the work was published before social media marketing and promotion were widely accepted in a field. In this article, we argue that altmetrics can provide useful information about older works in the form of documenting renewed attention to past scholarship as part of a scholar's legacy. Using the altmetrics profile of the late Dr. Thomas E. Starzl, often referred to as "the father of modern transplantation", we describe two cases where altmetrics provided information about renewed interest in his works: a controversy about race and genetics that shows the ongoing impact of a particular work, and posthumous remembrances by colleagues which reveal his scholarly legacy.

### Introduction: Altmetrics and Social Media

Altmetrics, a blend of the words alternative and metrics, show the uses of an article beyond citation counts, which are a method traditionally used to evaluate the impact of an article. Altmetrics, when employed in conjunction with citations, can show a wider impact of scholarly work; citations track formal, acknowledged influence, and altmetrics track the informal and social attention given to an article (Priem, Piwowar, & Hemminger, 2012; Cronin, 2001). Altmetrics do not directly correlate with citation counts; although some measures such as "Mendeley Readership" may predict future citations (Mohammadi, Thelwall, Haustein, & Larivière, 2015), social media in particular is weakly related to citations (Costas, Zahedi, & Wouters, 2015; de Winter, 2014) and the relationship between social media and citations may be influenced by factors like the extant digital footprint of the authors (Bar-Ilan et al., 2012).

Social media attention has been discussed often in the altmetrics literature. Analyses of social media often point to the fact that social media attention is higher for more recently published or released work (Kwok, 2013; Peters, Kraker, Lex, Gumpenberger, & Gorraiz, 2016). The presence of social media bots on platforms such as Twitter can impact the use of raw numbers for social media data, and researchers have cautioned that social media use must be examined and not taken at face value (Haustein et al., 2015). Furthermore, the promotional use of social media to share recently published papers, when done by the journal or the publisher, may have a bias effect on the social media numbers for a particular paper (Bornmann, 2014).

Because of the issues surrounding inflation of numbers and the relationship of social media to citations, some have debated the meaningfulness of social media metrics, distinguishing between social media sharing and attention given to papers and arguing that there is little correlation between the act of sharing a paper and making an informed comment about a work of scholarship (Crotty, 2014). Is a work being shared because the author is a famous scholar and has a strong body of work, or is the act of sharing a comment on the value of an article? What are the parameters of “meaningful” social media engagement and how can we tell whether that engagement is meaningful or not?

These considerations are all important when evaluating social attention given to a paper; however, examples of interesting and meaningful use of social media in academic contexts can help understand the ways that altmetrics show social impact. By examining the altmetrics activity surrounding the works of researcher Dr. Thomas E. Starzl, a pioneer in the field of organ transplantation, we describe two cases where older articles received social media attention: a controversial discussion and the death of the author. We argue that the cause for social media engagement is an important parameter in gauging whether the interaction is meaningful or not. Implications for archival practices are discussed.

## Background to the Project

After his retirement from active surgery in 1991, Dr. Starzl donated his papers to the Archives Service Center at the University Library System (ULS) at the University of Pittsburgh, as a way to ensure that his work would be accessible and usable to future generations of scholars. In addition to processing over 400 boxes of his archival documents, [a cross-departmental team of librarians](http://starzl.pitt.edu/contact.html) (starzl.pitt.edu/contact.html) digitized his Curriculum Vitae (originally in the form of hand-written pages in a series of three-ring binders) and created metadata for his publications using Optical Character Recognition (OCR). These metadata records were hand-checked for completeness and correctness, and then the records for Dr. Starzl’s publications were imported into the institutional repository for the University of Pittsburgh, D-Scholarship@Pitt. In addition, these records were used to share documents in PubMed Central, many of which are accessible today.

When the University Library System began to work with PlumX, which is an altmetrics service provided by the company Plum Analytics, all items in the institutional repository were imported into PlumX to gather metrics about their use. PlumX tracks five categories of metrics: usage (e.g. downloads, views), captures (e.g. bookmarks, readers), mentions (e.g. blog posts, news articles), social media (e.g. Twitter, Facebook), and citations (e.g. citation indices, patent citations) (for a more comprehensive explanation, see [plumanalytics.com/learn/about-metrics](http://plumanalytics.com/learn/about-metrics)). As expected, Dr. Starzl’s work had large amounts of citations (over 800 each on two individual articles, for example), but because the bulk of his work was done between 1963 and 1999, there was not much evidence of other altmetrics (including social media) surrounding Dr. Starzl’s work. The PlumX altmetrics profile for Dr. Starzl lay dormant for several years as the service was refined and implemented for active scholars.

When Dr. Starzl died on March 4, 2017, at the age of 90, staff at the University Library System noticed an increase of media attention surrounding his work that was captured in PlumX. Analysis of [the PlumX profile for Dr. Starzl](http://plu.mx/pitt/u/pitt-tes11) (plu.mx/pitt/u/pitt-tes11) revealed that his social media mentions had increased in the past two years

surrounding not only his death, but another incident where scholars had used his work to refute a controversial argument in popular news outlets. In the following sections, we detail the role of Dr. Starzl's research papers in these two situations.

## Controversy

After examining the PlumX profile for Dr. Starzl, one of his papers received occasional attention on Twitter and other social media outlets in response to an argument surrounding organ transplants. One side of the argument says that race is a factor when performing organ transplants, and this viewpoint is repeated occasionally in news stories (see, for example, "Black and Asian people wait YEAR longer for kidney transplant because of ethnic minority donor shortage," [March 12, 2014, in The Daily Mirror](#) ([mirror.co.uk/lifestyle/health/organ-donors-black-asian-people-3235968](http://mirror.co.uk/lifestyle/health/organ-donors-black-asian-people-3235968)) as well as on the website for the organization [Association for Multicultural Affairs in Transplantation](#) (AMAT) ([amat1.org/about-amat/closing-the-donation-gap](http://amat1.org/about-amat/closing-the-donation-gap)). This argument is also often repeated on social media outlets in discussions about the nature of race.

On several occasions when this argument has resurfaced on social media platforms, whether started by an individual or an organization, the 1990 paper "Effect of race upon organ donation and recipient survival in liver transplantation" (Pillay, Thiel, Cavalier, & Starzl, 1990), co-authored by Dr. Starzl, is frequently cited to disprove the idea that race factors into organ transplantation. By investigating the PlumX profile of Dr. Starzl and specifically [this article](#) (see [plu.mx/pitt/a/-KmvbhDSWlrlZJ2IRqdTyXCnWnLg2PsBjssfaLmH5QQ](https://plu.mx/pitt/a/-KmvbhDSWlrlZJ2IRqdTyXCnWnLg2PsBjssfaLmH5QQ)), we discovered a spike in social media mentions surrounding the publication and sharing of the 2014 article in the *Daily Mirror*, as well as a scattering of other tweets after individuals discovered the mission statement of AMAT. PlumX revealed several of those conversations. One exchange survives in whole; this interaction occurred on Twitter where this paper was used to back up an argument about race and transplants on Twitter (Figure 1). Although some of the argumentative tweets had been deleted and were no longer visible, the nature and tone of the argument is still evident based on one half of the conversation (Figure 2). These interactions show how a paper from more than two decades ago can be introduced into modern conversations. In this instance, these responses reflect on the content of the publication, rather than the relative fame of the author. Dr. Starzl is not mentioned by name; rather, the article itself is used as a reference during a debate. Crotty's (2014) warning about the difference between sharing and meaningful engagement is relevant here; the article is clearly being referenced as a piece of evidence in a modern and ongoing debate, therefore adding meaning to this new conversation as part of an informed comment.

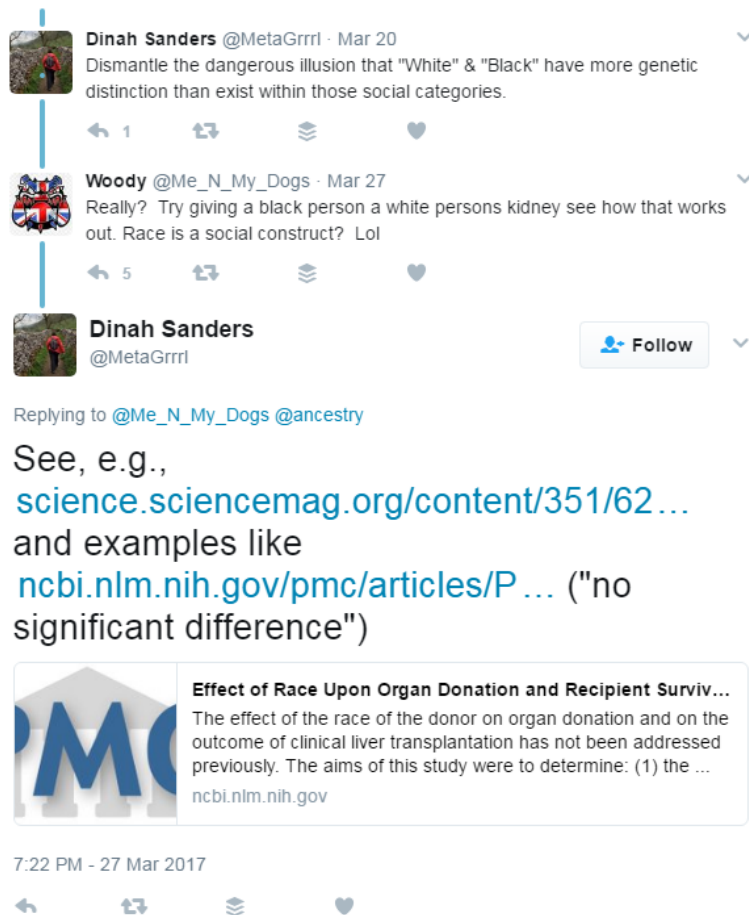


Figure 1

*A partial tweet series illustrating a use of a paper to refute an argument about race and transplants ([tinyurl.com/lyatdogor](http://tinyurl.com/lyatdogor))*

The screenshot shows a Twitter thread from April 28, 2013. It begins with Joseph P. Hillenburg (@cobaltjacket) replying to @mazzie with a link to an AMAT article. @mazzie then asks if Hillenburg is involved. Hillenburg explains that certain diseases affect some races more than others. @mazzie asks for clarification on 'adherence', which Hillenburg defines as taking medications. @mazzie shares her personal experience with medication. Hillenburg then follows up with a link to the AMAT article, which discusses the effect of donor race on organ donation and recipient survival. The article snippet is visible below the tweet. The tweet has 1 like and 3 replies.

Joseph P. Hillenburg @cobaltjacket · 28 Apr 2013  
@mazzie Did you know about this? [amat1.org](http://amat1.org)

sin diesel @mazzie · 28 Apr 2013  
@cobaltjacket are you involved with it?

Joseph P. Hillenburg @cobaltjacket · 28 Apr 2013  
@mazzie diseases that affect some races more than others (heart disease, some others)

sin diesel @mazzie · 28 Apr 2013  
@cobaltjacket what is adherence in this context?

Joseph P. Hillenburg @cobaltjacket · 28 Apr 2013  
@mazzie Adherence is how likely someone is to take their TX meds. The medical community doesn't like to re-TX people who won't stick with it

sin diesel @mazzie · 28 Apr 2013  
@cobaltjacket normally, I would say "why would you not take your meds?!" but after 6mo of shots and pills, I understand. I don't endorse tho

Joseph P. Hillenburg @cobaltjacket

Replying to @mazzie

@mazzie I think success rate depends upon organ: [ncbi.nlm.nih.gov/pmc/articles/P...](http://ncbi.nlm.nih.gov/pmc/articles/P...) no difference with liver...

**Effect of Race Upon Organ Donation and Recipient Surviv...**  
The effect of the race of the donor on organ donation and on the outcome of clinical liver transplantation has not been addressed previously. The aims of this study were to determine: (1) the ...  
[ncbi.nlm.nih.gov](http://ncbi.nlm.nih.gov)

LIKE 1

10:32 PM - 28 Apr 2013

Figure 2

A conversation on Twitter about race and transplant information on the website of the Association for Multicultural Affairs in Transplantation (AMAT) ([tinyurl.com/y88vxvgh](http://tinyurl.com/y88vxvgh))

In summary, altmetrics can reveal when a paper published many years ago is used in new contexts. Because of new communication and education efforts by scholars who use social media, foundational works like this 1990 paper are occasionally brought into the conversation as evidence or illustration during a discussion. This usage adds to an understanding of the life cycle of a scholarly work, in that its continued use after publication relies not just on other scholars who cite it, but also those who are engaging in public discussions on important topics using foundational works of scholarship.

## Posthumous Social Media Attention

When Dr. Starzl died on March 4, 2017, many news outlets covered his death and described his body of work in order to contextualize his contributions to medicine and science. In addition, many of Dr. Starzl's students and colleagues shared their history with Dr. Starzl, and many of them linked to their favorite papers.

The most discussed paper in this context was perhaps Dr. Starzl's most monumental contribution, a 1968 article on the first successful series of liver transplants entitled "Orthotopic homotransplantation of the human liver" (Starzl et al., 1968). The journal *Annals of Surgery*, which published the paper in 1968, shared the digitized version of the paper on Twitter to honor Dr. Starzl's death (Figure 3). This tweet was then retweeted 249 times as of the writing of this article, and many Twitter users replied and shared their own experience with the paper or Dr. Starzl himself, commenting on his impact on their careers and the advancement of the field which occurred as a result this particular work (Figures 4 and 5). While this particular tweet from *Annals of Surgery* could be construed as a journal marketing its own work, the event that prompted the tweet was not a new publication that could benefit from a boost in attention for the journal. Rather, the event prompting the tweet was the death of the author, and the major benefit to the journal from the article was likely already in the past. Therefore, the self-promotional bias effect mentioned by Bornmann (2014) is not applicable to this particular tweet because the work was published five decades prior (1968) and the major impact of the article and benefit to the journal had already been realized. What is meaningful and informative about this social media engagement with Dr. Starzl's work is not only the journal's tweet, but the comments and retweets from other scholars sharing memories and commentary about the impact of Dr. Starzl's work broadly.

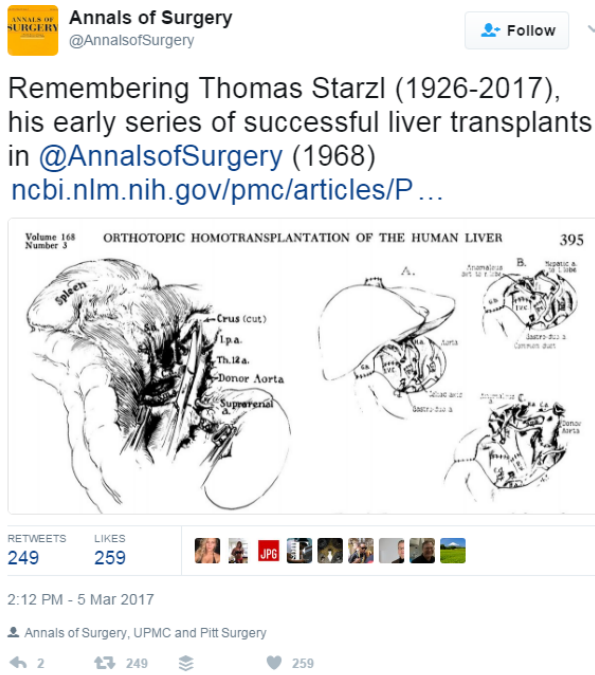


Figure 3

A tweet from the journal Annals of Surgery in remembrance of Dr. Starzl ([tinyurl.com/yd9lerj8](https://tinyurl.com/yd9lerj8))



Figure 4

A retweet of the Annals of Surgery tweet with an additional link to a book by Dr. Starzl ([tinyurl.com/y7hrlcxy](https://tinyurl.com/y7hrlcxy))





Figure 5

*A retweet of the Annals of Surgery tweet with a personal remembrance of Dr. Starzl. ([tinyurl.com/y9yyf2jw](https://tinyurl.com/y9yyf2jw))*

Other papers by Dr. Starzl were mentioned on social media to a smaller extent, but were often introduced by colleagues who were remembering his contributions. One example is his 1963 paper, “The reversal of rejection in human renal homografts with subsequent development of homograft tolerance” (Starzl, Marchiorio, & Waddell, 1963), which was mentioned a few days after his death by a colleague on Twitter, who pointed out the significance of this particular paper (Figure 6).

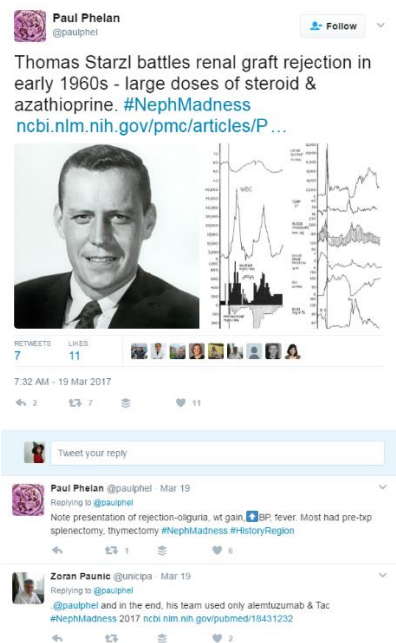


Figure 6

*A tweet in remembrance of Dr. Starzl several days after his death, including a link and short summary of an article ([tinyurl.com/lyctm5lnv](https://tinyurl.com/lyctm5lnv))*



After Dr. Starzl's death, PlumX was also able to reveal attention surrounding [the website for Dr. Starzl's collection](#) at the University of Pittsburgh ([tinyurl.com/yadbgnrb](http://tinyurl.com/yadbgnrb)). The tweets about Dr. Starzl that mentioned his website mourned his death and pointed to his impressive body of work described on the website. This expression of grief and gratitude for the deceased scholar through the medium of social media was captured by PlumX. This reveals how altmetrics tools can be a way to reveal the legacy of a scholar's work. In contrast with the tweets about the AMAT website discussed previously, which engaged with a particular work and did not mention the author by name, the engagement after Dr. Starzl's death was focused around the impact of the author himself and his scholarly legacy.

## Effect on Understanding Starzl's Legacy

As with many researchers of great impact, Dr. Starzl was concerned with the way his achievements would be utilized after his death. During the course of his work with University of Pittsburgh librarians, one of the major purposes he stated for donating his archives to the University was to ensure that his material would be available for future researchers to use and build upon. The work put in by multiple ULS departments to digitize, describe, and ingest his over 2,200 articles into the D-Scholarship@Pitt institutional repository was the first major step towards achieving this goal. As much of this work was completed in 2011 and 2012, before the library's widespread adoption of altmetrics tools, this was done less as a way to help boost the metrics on his (already quite impactful) works, and more as a method of preserving his material in one singular, permanent location for easy reference and access. The import of the material into PlumX was a byproduct of the larger integration, and while the staff noted with interest what altmetrics said about his work, this discovery of Dr. Starzl's legacy and ongoing impact was not anticipated when we began the altmetrics project.

After his death, the archival collection held at the Archives Service Center quickly came up as a topic of discussion, even being mentioned at his memorial service during a former colleague's eulogy. While work on the physical collection is still ongoing as additional material is transferred from his office to the archives, the digitized articles in the institutional repository, D-Scholarship@Pitt, serve as the most immediately publicly available portion of his papers. While data like the increased citations and social mentions in the wake of his death cannot be included as an official part of the archival collection, it can be captured and recorded in the collection's case file to help inform the work of the archivists. The archivists see these spikes as evidence of which portions of the collection are of the most importance to researchers, even 50 years after he performed the world's first successful liver transplant. It also helps put his work into the social context, helping archivists understand the conversations around their collection subjects and how their material can further contribute to the discourse.

## Conclusion

While this paper, admittedly, references one scholar whose body of work changed an entire field, the cases presented here show that alternative metrics can be applicable to understanding the ongoing use and legacy of a scholar's work. Even work published more than a decade prior can be used as a reference in social media debate, and work completed as far back as the 1960s may experience an altmetrics surge.

Beyond gathering numbers, however, altmetrics tools can show a scholar's legacy. An older work is used as the definitive reference in a heated debate on an important medical topic, and the infrequent but consistent referencing of a paper on social media can show its use in combating widespread or popular misinformation. Altmetrics here reveal the lasting impact of a particular work of scholarship. After his death, Dr. Starzl received social media mentions from hundreds of people across the world in at least five different languages, and those are just the ones that reference his publications in some way. We know that Dr. Thomas E. Starzl was a legend in his field, and the social media reaction

at his death shows just how much of an impact he, as a scholar, had on his field and his fellow scholars. In this case, altmetrics can reveal the legacy of a work of scholarship as well as the scholar himself.

We have provided just two examples of how altmetrics, specifically social media, may be meaningful for older works of scholarship, and we recognize that there may be many more examples beyond these. We invite our colleagues to share additional examples of how altmetrics can provide information about older works of scholarship and a scholar's legacy.

In conclusion, this small case study provides two examples of ways that altmetrics can lend insight into the use of an older work of scholarship. The lack of altmetrics for older works has been cited as a drawback to using altmetrics tools (Kwok, 2013; Peters, Kraker, Lex, Gumpenberger, & Gorraiz, 2016), and we acknowledge that older works do not benefit from the marketing and promotion that a newly published work may receive (Bornmann, 2014). This lack of immediate information may cause older scholarship to be overlooked when creating altmetrics profiles and services. However, we argue that altmetrics for older works should not be ignored. While they may not have numbers that are as high or as immediate as the newer works, altmetrics indicators can reveal interesting and informative situations where new meaning is given to older works. In fact, as this case study of Dr. Starzl's altmetrics profile shows, the altmetrics of an older paper show where Crotty's distinction between sharing and an "informed comment" (Crotty, 2014) are more clear. To revisit an older work and share it on social media means there must be something new or interesting about it to comment on, or it must be relevant to the ongoing discourse in some way. This interest can be helpful to a scholar who may want to revisit an old project, to archivists and librarians working on related material, or a comfort to scholars who want to share their memories of a late colleague's contributions to their field.

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