



[AI analyzed 3.3 million scientific abstracts and discovered possible new materials](#) [1]

## AI + Materials Science: How far away is that from us?

**The excitement:** A group of researchers [2] in US used the Natural-language processing technique to digest 3.3 million scientific abstracts published between 1922 and 2018 in journals that would possibly contain materials science research. The reasoning behind was that the resulting word relationships could capture fundamental knowledge within the field, including the structure of the periodic table and the way chemicals' structures relate to their properties. Because of the technique's ability to compute analogies, a number of new chemical compounds was identified that demonstrate properties similar to those of known materials but had not been studied as such before. The researchers believed this could be a new way to mine existing scientific literature for previously unconsidered correlations and accelerate the advancement of research in a field. This is just one example showcasing how artificial intelligence (AI) can potentially boost materials science.

During this project, you will be involved in the following activities for an insightful reflection of how AI is already changing and will change the materials development.

- To investigate of existing scientific activities combining AI and materials science
- To survey the research activities of AI + Materials Science at Chalmers and other Swedish Universities, and at Swedish industries
- To discuss about where the future of AI+ Materials Science is
- To provide suggestion to CHAIR (Chalmers AI Research Centre) [3]
- To identify open access/ open-source AI platform with which even bachelor students can do something about AI + Materials Science

Literature recommendation:

[1] <https://www.technologyreview.com/2019/07/09/134261/ai-nlp-scientific-abstracts-material-science/>

[2] Tshitoyan, V., Dagdelen, J., Weston, L. *et al.* Unsupervised word embeddings capture latent knowledge from materials science literature. *Nature* **571**, 95–98 (2019). <https://doi.org/10.1038/s41586-019-1335-8>

[3] <https://www.chalmers.se/en/centres/chair/Pages/default.aspx>

**Target group of students**  
TKMAS, TKITE, TKDES,  
TKELT, TKTFY, TKDAT

**Group size**  
4-6

**Special requirements**  
Basic knowledge in materials science and engineering; with interest in artificial intelligence; alternatively basic knowledge in artificial intelligence, with interest in materials science.

**Suggestion from**  
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**Can the project be duplicated?**  
Yes (metallic material/ceramics/polymeric material, etc)

**Language:**  
English