

SEARCHING, PROCESSING AND REVIEWING OF SCIENTIFIC LITERATURE

Introduction Master Thesis

1) SEARCHING

SOURCES

- Journals
- Conferences
- Patents
- Technical websites
- Standards
- Master's and PhD theses

BROWSING SCIENTIFIC LITERATURE (1)

- Through <http://lib.ugent.be/en/databases>
- Databases
 - **Web of science**

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Databases

Google Scholar [↗](#)

Google Scholar is a freely-accessible web search engine by Google that indexes the full-text of scholarly literature across a very wide array of publishing formats and disciplines.

WoS : Web of Science [↗](#)

Explore the ISI Web of Science database with multidisciplinary coverage of over 10,000 high-impact journals in the sciences, social sciences and arts and humanities, as well as over 120.000 conference proceedings.

PubMed [↗](#)

PubMed by the U.S. National Library of Medicine includes over 18 million citations for biomedical articles back to the 1950s. PubMed includes links to the full text and related resources.

Catalogs

UniCat : virtual Belgian union catalogue [↗](#)

UniCat is a union catalogue of Belgian libraries. It's the successor of the CCB (Collectieve Catalogus België). It currently holds some 14 million records from the main Belgian university libraries and the Royal Library.

Antilope : Belgian union catalogue for periodicals [↗](#)

Antilope is the Belgian union catalogue of periodicals. You can search it to find a library holding the specific volumes/issues you are looking for.

WorldCat [↗](#)

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Web of Science Categories

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- Mechanics 38
- Energy Fuels 28
- Construction Building Technology 13

[See all](#)

Authors

- De Paepe M 108
- Huisseune H 37

108 results from Web of Science Core Collection for:

heat transfer (All Fields) and de paepe m (Author)

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Document Types

0/108 Add To Marked List Export ▼ Relevance ▼ < 1 of 3 >

1 Heat transfer and friction characteristics of an adapted inclined louvered fin

T'Joel, C; De Paepe, M; (...); Willockx, A
 ASME Heat Transfer Summer Conference
 2005 | HT2005: Proceedings of the ASME Summer Heat Transfer Conference 2005, Vol 4 , pp.389-396

A fin-and-tube evaporator of a commercially available air conditioning unit was studied experimentally. To this end a test rig was constructed to measure the heat transfer capacity on the air and waterside of the evaporator. A wide range of Reynolds numbers on the air side was investigated, focusing on the low Reynolds numbers, as modern air co ... [Show more](#)

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2 Flow regime based heat transfer correlation for R245fa in a 3 mm tube

Billiet, M; Ameer, B; (...); De Paepe, M
 Feb 2018 | INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER 117 , pp.1304-1311

241 heat transfer measurements for R245fa were conducted. The heat transfer coefficient was determined for a smooth stainless steel tube with an inner tube diameter of 3 mm. The experiments were conducted for five mass fluxes (100, 300, 500, 700 and 1000 kg/(m(2) s)), three heat fluxes (10, 30 and 50 kW/m(2)) and at three saturation temperati ... [Show more](#)

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Title:

Flow regime based heat transfer correlation for R245fa in a 3 mm tube

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International Journal of Heat and Mass Transfer [0017-9310] Billiet, Marijn yr:2018 vol:117 pg:1304 -1311

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Search results > Flow regime based heat transfer corre...

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**Flow regime based heat transfer correlation for R245fa in a 3 mm tube**

Marijn Billiet (UGent) , Bernd Ameel (UGent) , Romain Charnay, Rémi Revellin and Michel De Paepe (UGent)
 (2018) INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER. 117. p.1304-1311

Author

Marijn Billiet (UGent) , Bernd Ameel (UGent) , Romain Charnay, Rémi Revellin and Michel De Paepe (UGent)

Organization

Department of Flow, heat and combustion mechanics

Abstract

241 heat transfer measurements for R245fa were conducted. The heat transfer coefficient was determined for a smooth stainless steel tube with an inner tube diameter of 3 mm. The experiments were conducted for five mass fluxes (100, 300, 500, 700 and 1000 kg/(m² s)), three heat fluxes (10, 30 and 50 kW/m²) and at three saturation temperatures (40 °C, 70 °C and 125 °C). The experiments were used to determine the influence of the saturation temperature, mass flux, heat flux, vapour quality and flow regime on the heat transfer coefficient. At a low saturation temperature, the heat transfer coefficient increases with an increasing mass flux. However, at a high saturation temperature the heat transfer coefficient decreases with an increasing mass flux. Furthermore, the heat transfer coefficient increases with increasing vapour quality at a low saturation temperature. On the contrary, the heat transfer coefficient decreases at higher saturation temperatures. Due to the fact that most heat transfer models found in literature are developed for low saturation temperatures and one flow regime, the heat transfer coefficients predicted by the existing models do not comply very well with the experimental data. Thus, a new heat transfer correlation for R245fa was proposed. The new correlation has a Mean Absolute Error of 11.7% for the experimental data of a tube with an inner tube diameter of 3 mm. Finally, this new correlation was also verified with R245fa datasets of other authors.

Keywords

two-phase, refrigerant, heat transfer measurement

Subject

Technology and Engineering

Year

2018

Publication type

Journal Article (Original Article)

Publication status

published

Journal title

INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER

Int. J. Heat Mass Transf.

ISSN

0017-9310

1879-2189

Volume

117

Pages

BROWSING SCIENTIFIC LITERATURE (2)

- Databases
 - Web of science
 - **Google Scholar:** searches in journal papers, patents, theses, conference proceedings



Articles (include patents) Case law

Articles

Analysis of anisotropy and strain rate sensitivity of open-cell metal foamM Vesenjak, C Veyhl, T Fiedler - *Materials Science and Engineering: A*, 2012 - Elsevier

Case law

This paper addresses numerical and experimental analysis of the m. pore@ aluminium **foam**.

My library

Numerical models are based on computed tomography data in order to capture the complex material meso-structure. Uni-axial experimental tests were performed for quasi-static ...

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Strong wall and transverse size effects on pressure drop of flow through open-cell metal foamN Dukhan, M Ali - *International Journal of Thermal Sciences*, 2012 - ElsevierIn applications where a fluid flows through the **open** pores of **metal foam**, the **foam** is treated as an infinite porous medium for which the Darcy law and the Forchheimer equation are applied, in order to describe the pressure drop and to obtain the permeability and form ...

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Effect of frequency on heat transfer due to oscillating water flow in open-cell metal foam: An experimental studyN Dukhan, Ö Bağcı, LA Kavurmacıoğlu - *Experimental Thermal and Fluid ...*, 2015 - ElsevierAbstract Heat transfer due to oscillating water flow in **open-cell** aluminum-**foam** pipe subjected to constant wall heat flux was investigated experimentally. The **foam** had 20 pores per inch and a porosity of 87.6%. Three flow displacements 1.5, 1.9 and 2.2 pipe ...

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 include patents include citations Create alert**Thermo-fluidic characteristics of open cell metal foam as an anodes for DCFC, part I: Head loss coefficient of metal foam**TH Kim, W Lee, JH Jeong - *International Journal of Hydrogen Energy*, 2014 - ElsevierAbstract A porous **metal** was suggested to be used for the anode of a DCFC. Thermo-fluidic characteristics of fuel-electrolyte mixture in the porous **metal** should be known in order for proper design of the anode. Previous researchers investigated pressure drop and heat ...

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[PDF] researchgate.net
Fulltext@UGent**Thermal development in open-cell metal foam: An experiment with constant wall heat flux**N Dukhan, Ö Bağcı, M Özdemir - *International Journal of Heat and Mass ...*, 2015 - ElsevierAbstract Experimental heat transfer results for a commercial **open-cell** aluminum **foam** cylinder heated at the wall by a constant heat flux and cooled by water flow, are presented. The results cover thermal-entry and fully-developed regions. Measurements include wall ...

Cited by 10 Related articles All 5 versions Web of Science: 6 Cite Save

[PDF] researchgate.net
Fulltext@UGent**Buoyancy driven convection in open-cell metal foam using the volume averaging theory**S De Champheleire, K De Kerpel, P De Jaeger... - *Applied Thermal ...*, 2015 - ElsevierAbstract Heat sinks with **open-cell** aluminium **foam** are studied numerically in buoyancy driven convection with air as surrounding medium. Results from a 2D numerical model are compared to experiments for different **foam** heights. The numerical model is based on the ...

Cited by 4 Related articles All 4 versions Web of Science: 4 Cite Save

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BROWSING SCIENTIFIC LITERATURE (3)

- Databases
 - Web of science
 - Google Scholar
 - **ScienceDirect** (Elsevier)

The screenshot shows the ScienceDirect website interface. The URL www.sciencedirect.com/science/journal/00179310 is circled in red. The search bar contains the author name 'De Paepe M', which is also circled in red. Below the search bar, the journal title 'International Journal of Heat and Mass Transfer' is displayed. The page includes navigation links like 'Home + Recent Actions', 'Publications', 'Search', 'My settings', 'My alerts', and 'Shopping cart'. There are also links for 'Sample Issue Online', 'About this Journal', 'Submit your Article', 'Shortcut link to this Title', 'New Article Feed', and 'Add to Favorites'.

The screenshot shows a list of six research articles from the International Journal of Heat and Mass Transfer. Each article entry includes a checkbox, a menu icon, the article title, journal information, authors, and options to 'Show preview' or 'PDF'. The articles are:

- Assessing the influence of four cutting methods on the thermal contact resistance of open-cell aluminum foam** Original Research Article
International Journal of Heat and Mass Transfer, Volume 55, Issues 21–22, October 2012, Pages 6142-6151
P. De Jaeger, C. T'Joen, H. Huisseune, B. Ameel, S. De Schampheleire, M. De Paepe
Show preview | PDF (889 K) | Related articles | Related reference work articles
- Two-phase flow behaviour and pressure drop of R134a in a smooth hairpin** Original Research Article
International Journal of Heat and Mass Transfer, Volume 55, Issue 4, 31 January 2012, Pages 1179-1188
K. De Kerpel, B. Ameel, H. Huisseune, C. T'Joen, H. Canière, M. De Paepe
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- Assessing the influence of four bonding methods on the thermal contact resistance of open-cell aluminum foam** Original Research Article
International Journal of Heat and Mass Transfer, Volume 55, Issues 21–22, October 2012, Pages 6200-6210
P. De Jaeger, C. T'Joen, H. Huisseune, B. Ameel, S. De Schampheleire, M. De Paepe
Show preview | PDF (995 K) | Related articles | Related reference work articles
- Mapping of horizontal refrigerant two-phase flow patterns based on clustering of capacitive sensor signals** Original Research Article
International Journal of Heat and Mass Transfer, Volume 53, Issues 23–24, November 2010, Pages 5298-5307
H. Canière, B. Bauwens, C. T'Joen, M. De Paepe
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- Interaction between mean flow and thermo-hydraulic behaviour in inclined louvered fins** Original Research Article
International Journal of Heat and Mass Transfer, Volume 54, Issue 4, 31 January 2011, Pages 826-837
C. T'Joen, H. Huisseune, H. Canière, H.J. Steeman, A. Willockx, M. De Paepe
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- Thermo-hydraulic study of a single row heat exchanger consisting of metal foam covered round tubes** Original Research Article
International Journal of Heat and Mass Transfer, Volume 53, Issues 15–16, July 2010, Pages 3262-3274
C. T'Joen, P. De Jaeger, H. Huisseune, S. Van Herzele, N. Vorst, M. De Paepe
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CAN'T FIND PAPER?

- Try contacting the author
 - Check whether they have a profile on [ResearchGate](#) or [Academia](#), use interface to request paper copy.
 - Or e-mail them, saying their work is of interest to you
- Contact your daily supervisor for interlibrary request

BROWSING SCIENTIFIC LITERATURE (4)

– Conferences

- Some conference papers via Web of Science (no full paper)
- Shared folders for proceedings of attended conferences
- SAE (Society of Automotive Engineers) important for TT
→ check with supervisor whether available.
- Found an interesting paper, but not available at UGent?
Ask your supervisor to order it!
(after having tried with the author)

BROWSING SCIENTIFIC LITERATURE (5)

– Patents

- <http://be.espacenet.com>
- <http://google.com/patents>
- Search via Google Scholar

– Technical websites

- WTCB

– Standards

- NBN Belgian standards:
 - <https://edu.mynbn.be/>
 - login and password: your UGent credentials (read-only access)
- Other countries/associations, e.g. ISO, EN, ASTM, BS, ASHRAE, AAMA, VDI, RAG:
 - ask supervisor if cannot be found

The screenshot shows the WTCB website interface. At the top left is the WTCB logo with the tagline 'Onderzoek • Ontwikkel • Informeer'. At the top right, there is a search bar with the text 'Wat zoekt u?' and 'WTCB Publicaties', and a red circle around the 'Aanmelden' button. Below the search bar, there is a navigation menu with 'Informatie en ondersteuning' and 'Onderzoek, ontwikkeling en innovatie'. The main content area features a banner with technical drawings and a call to action 'Download alle publicaties!'. Below the banner, there is a section titled 'Publicaties' with three columns: 'Per publicatiereeks', 'Per bouwberoep', and 'Per thema'. The 'Per publicatiereeks' column lists items like 'Technische Voorlichtingen (TV's)', 'WTCB-Contact', 'WTCB-Dossiers', 'Infiches', 'WTCB-Tijdschrift', 'WTCB-Digest', 'WTCB-Rapport', 'Meetstaat van gebouwen', 'Monografieën', and 'Normen'. The 'Per bouwberoep' column lists items like 'Ruwbouw en algemene aannemingen', 'Hellende daken', 'Glaswerken', 'Tegel- en mozaïekwerken', 'Steen en marmer', 'Sanitaire installaties en gas', 'Platte daken en dichtingswerken', 'Schrijnwerken', 'Pleister- en voegwerken', 'Schilderwerken en soepele bekledingen', and 'Verwarming en klimaatregeling'. The 'Per thema' column lists items like 'Duurzaam bouwen en renoveren', 'Energieprestaties', 'Akoestisch comfort', and 'Beheer, kwaliteit en ICT'. At the bottom right, there is a button labeled 'Geavanceerd zoeken'. At the bottom left, there is a section titled 'Laatst verschenen publicaties'.

Login&password: ask supervisor

BROWSING SCIENTIFIC LITERATURE (6)

– Previous master theses

– <http://lib.ugent.be>

– Only online when >14/20 and not confidential

The image shows a screenshot of the Ghent University library website. The top navigation bar includes 'Home', 'Libraries', 'Databases', and 'About'. A search bar contains the text 'Kim Carbonez'. Below the search bar, the results page shows '1 - 8 of 8 Search Results'. On the left, there are filters for 'Type', 'Access', 'Year', 'Faculty', and 'Language'. The 'Type' filter has 'master (1)' selected and highlighted with a red box. The 'Access' filter has 'online (8)' selected. The 'Year' filter has 'After' selected with '2013' in the input field. The 'Faculty' filter has 'Engineering & Architecture (8)' selected. The 'Language' filter has 'English (7)' selected. On the right, there are three search results. The first result is a presentation titled 'Comparison between uniform rain loads and point sources to simulate rainwater leakage with commercial HAM-models' by Kim Carbonez, with a 'View online' button. The second result is a presentation titled 'On the applicability of quantitative infrared thermography on window glazing' by Kim Carbonez, with a 'View online' button. The third result is a master thesis titled 'Finite element simulation of tensioned membrane structures in deployable systems' by Kim Carbonez, submitted in 2013, with a 'View online' button highlighted by a red dashed box. The bottom left corner features the Ghent University logo.

2) PROCESSING

PROCESSING SCIENTIFIC LITERATURE (1)

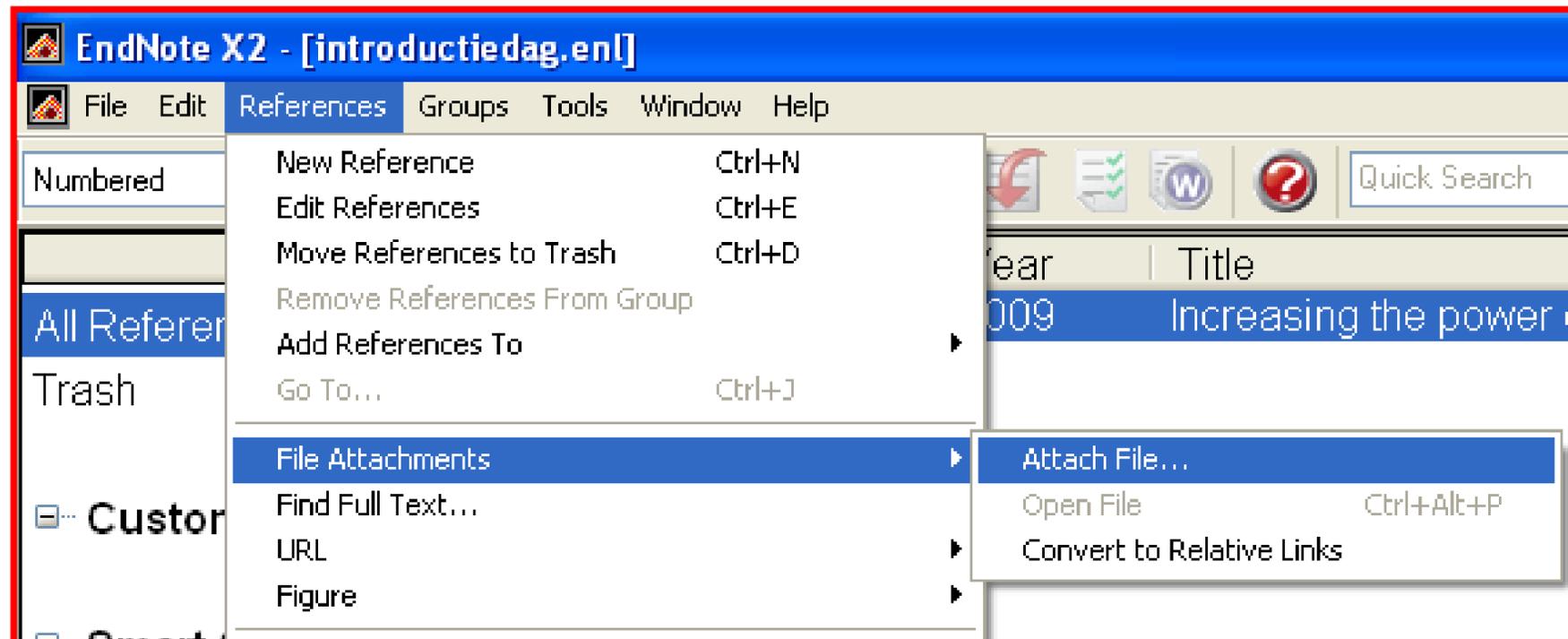
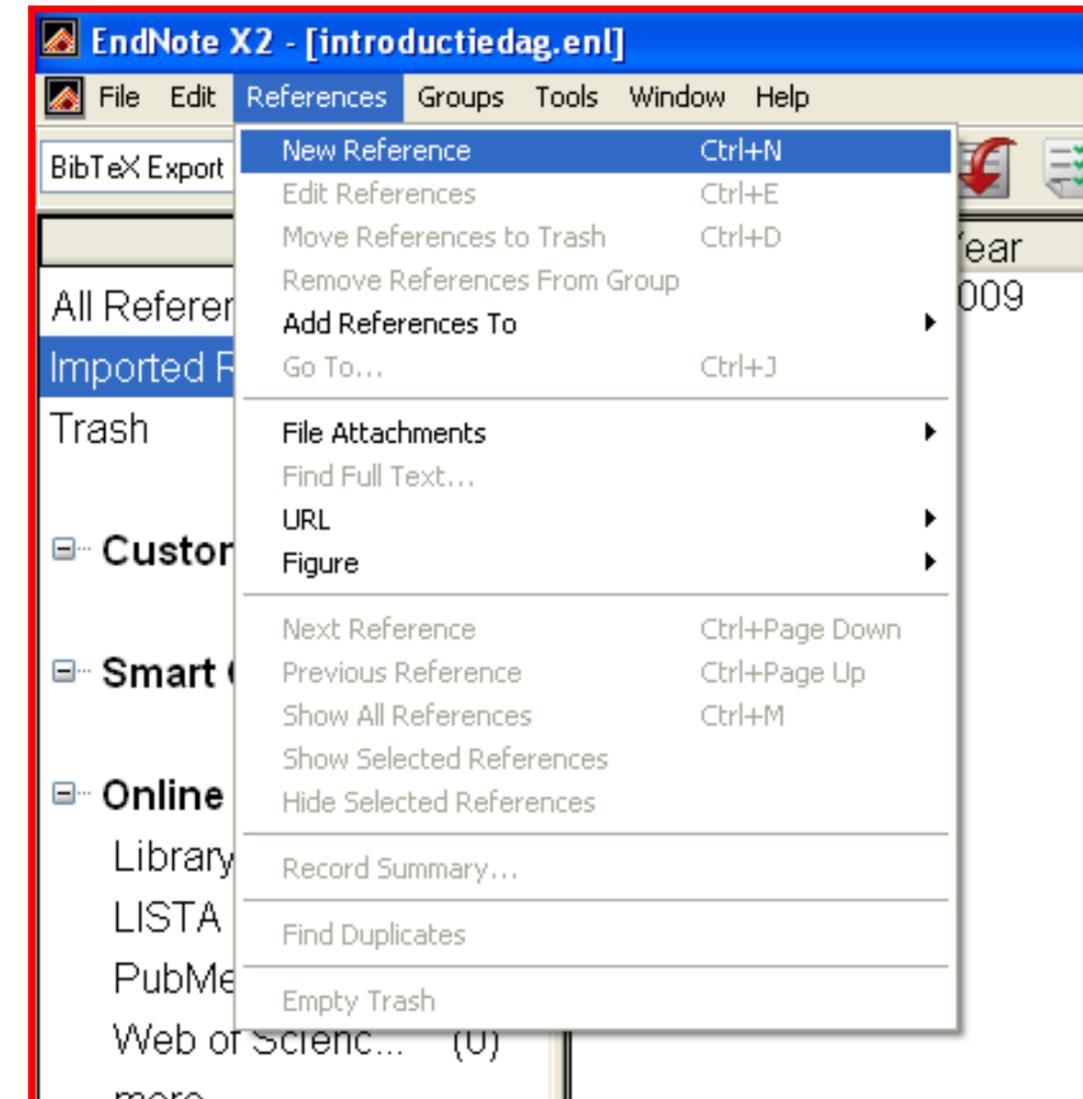
Reference software:

- **Endnote**: via Athena [/Office/Endnote](#)
 - Compatible with Word and LaTeX
 - <http://helpdesk.ugent.be/software/endnote.php>
- Mendeley (free ref. manager... From Elsevier)
 - Compatible with Word, Latex, Open-office
 - More info: www.mendeley.com/features/
- Others...

ENDNOTE (1)



- Export references from databases:
 - ScienceDirect, google scholar, WoS
- Add new reference manually
- Add PDF version of the paper





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Analysis of anisotropy and strain rate sensitivity of open-cell metal foam

M Vesenjak, C Veyhl, T Fiedler - *Materials Science and Engineering: A*, 2012 - Elsevier

This paper addresses numerical and experimental analysis of the m. pore® aluminium foam. Numerical models are based on computed tomography data in order to capture the complex material meso-structure. Uni-axial experimental tests were performed for quasi-static ...

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Fulltext@UGent

Strong wall and transverse size effects on porous open-cell metal foam

N Dukhan, M Ali - *International Journal of Thermal Sciences*

In applications where a fluid flows through the open pore as an infinite porous medium for which the Darcy law and applied, in order to describe the pressure drop and to obtain ...

Cited by 26 Related articles All 5 versions Web of Science: 1

Effect of frequency on heat transfer due to oscillating water flow in porous metal foam: An experimental study

N Dukhan, Ö Bağcı, LA Kavurmacioğlu - *Experimental Thermal and Fluid Science*

Abstract Heat transfer due to oscillating water flow in porous metal foam subjected to constant wall heat flux was investigated experimentally. The porous metal foam was characterized by its porosity per inch and a porosity of 87.6%. Three flow displacement frequencies were used ...

Cited by 2 Related articles Web of Science: 1 Cite

Thermo-fluidic characteristics of open cell metal foam part I: Head loss coefficient of metal foam

TH Kim, W Lee, JH Jeong - *International Journal of Hydrogen Energy*

Abstract A porous metal was suggested to be used for the anode of a fuel cell. The characteristics of fuel-electrolyte mixture in the porous metal were investigated. The proper design of the anode. Previous researchers investigated the characteristics of fuel-electrolyte mixture in the porous metal ...

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Thermal development in open-cell metal foam subjected to constant wall heat flux

N Dukhan, Ö Bağcı, M Özdemir - *International Journal of Thermal Sciences*

Abstract Experimental heat transfer results for a commercial porous metal foam cylinder heated at the wall by a constant heat flux and cooled by a constant ...

The results cover thermal-entry and fully-developed regions. Measurements include wall ...

Cite

Copy and paste a formatted citation or use one of the links to import into a bibliography manager.

MLA Vesenjak, M., C. Veyhl, and T. Fiedler. "Analysis of anisotropy and strain rate sensitivity of open-cell metal foam." *Materials Science and Engineering: A* 541 (2012): 105-109.

APA Vesenjak, M., Veyhl, C., & Fiedler, T. (2012). Analysis of anisotropy and strain rate sensitivity of open-cell metal foam. *Materials Science and Engineering: A*, 541, 105-109.

Chicago Vesenjak, M., C. Veyhl, and T. Fiedler. "Analysis of anisotropy and strain rate sensitivity of open-cell metal foam." *Materials Science and Engineering: A* 541 (2012): 105-109.

Harvard Vesenjak, M., Veyhl, C. and Fiedler, T., 2012. Analysis of anisotropy and strain rate sensitivity of open-cell metal foam. *Materials Science and Engineering: A*, 541, pp.105-109.

Vancouver Vesenjak M, Veyhl C, Fiedler T. Analysis of anisotropy and strain rate sensitivity of open-cell metal foam. *Materials Science and Engineering: A*. 2012 Apr 15;541:105-9.

BibTeX EndNote RefMan RefWorks

ENDNOTE (2)

- Tip: create Smart Groups
- Not read / read / not used / different subjects / based on keywords

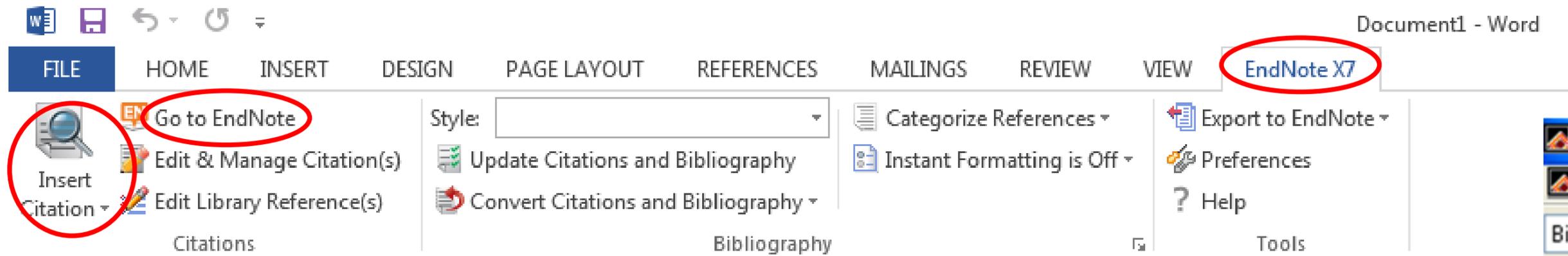
The image shows a screenshot of the EndNote X2 software interface. The main window title is "EndNote X2 - [introductiedag.enl]". The menu bar includes "File", "Edit", "References", "Groups", "Tools", "Window", and "Help". The "Groups" menu is open, showing options: "Create Group", "Create Smart Group" (highlighted with a red circle), "Rename Group", "Edit Group...", "Delete Group", "Add References To", and "Hide Groups". A red arrow points from the "Create Smart Group" option to a "Smart Group" dialog box. The dialog box has a blue title bar and contains the following fields:

	Keywords	Contains	niet-gebruikt	+	-
And	Year	Contains		+	-
And	Title	Contains		+	-

At the bottom of the dialog box, there are buttons for "Create", "Cancel", and "Options...", along with checkboxes for "Match Case" and "Match Words".

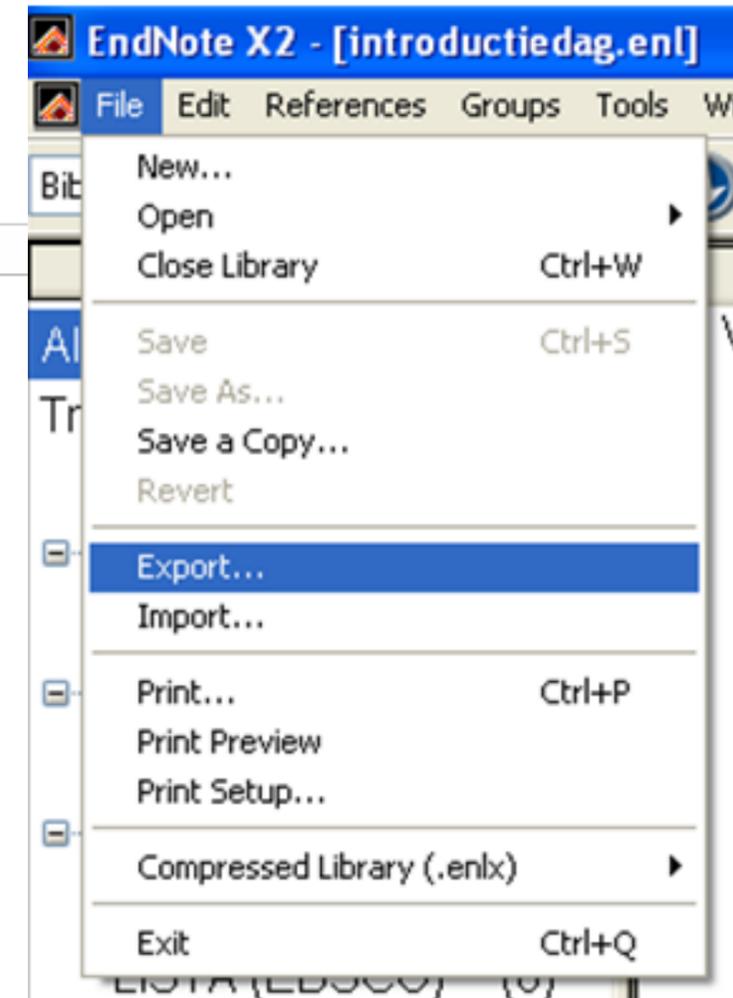
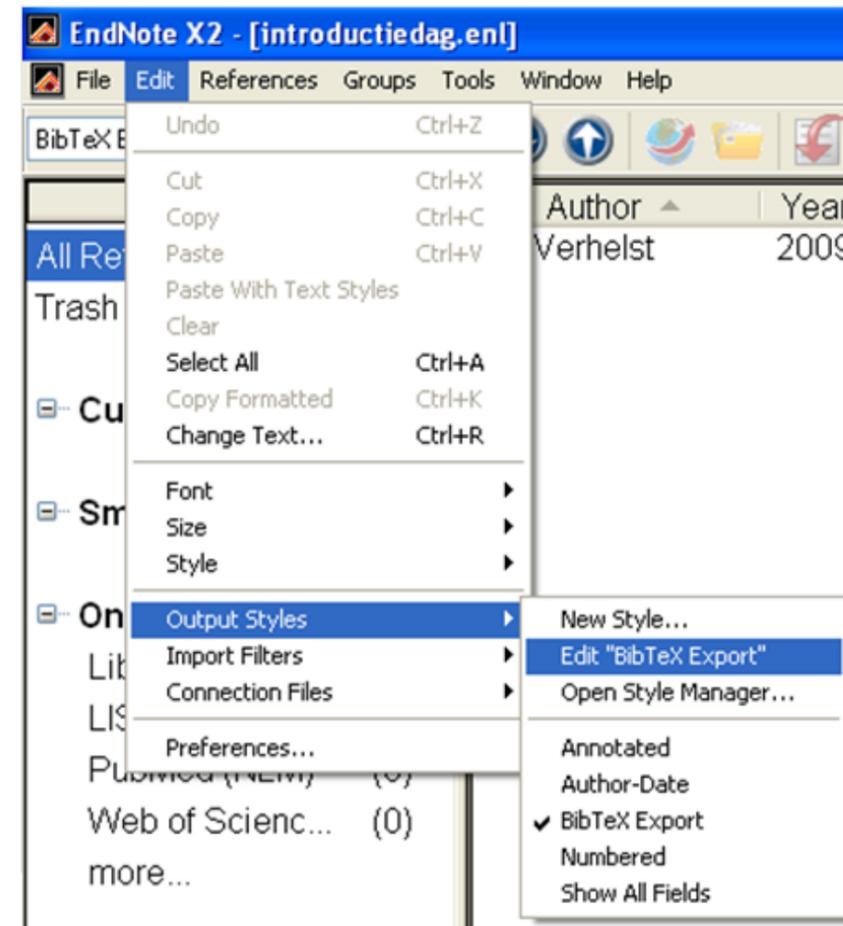
ENDNOTE (3)

– Endnote and Word (free via Athena)



– Endnote and LaTeX

- Export .enl file to .bib file
- Output style “BibTeX Export”
- Refer in text via `\cite{label}`
- More info: latex.ugent.be



3) YOUR LITERATURE STUDY

HOW TO WRITE A GOOD INTRODUCTION AND LITERATURE SURVEY? (1)

- **Start** by introducing the broad context of the thesis
 - Not too broad (“in the beginning, there was nothing...”)
 - Think about reader: e.g. external jury member (= not directly working on your topic). Background = MaEM graduate
- **Finish** by giving the problem and goal statement
- Your survey (for yourself!) should answer **3 questions**:
 - What is already known?
 - What can I use directly to solve my problem?
 - Where are the results contradictory / Where is knowledge still lacking?
- The final *review* is **not** a summary of every paper you have read, but rather a synthesis of the current ‘state of the art’ concerning your research topic
 - The summary is still useful for yourself, as a first step

HOW TO WRITE A GOOD INTRODUCTION AND LITERATURE SURVEY? (2)

- At the conclusion of your survey you can state what the specific **goal** of your thesis is, e.g.:
 - Applying the available knowledge to a specific (**new**) problem
 - Gathering **new** fundamental knowledge by investigating the identified issues in the literature survey
- **Don't try to be exhaustive**
 - Avoid recitation, but stress the differences-similarities
 - Ask yourself if the reader really needs the information to understand your story/follow your statement
- Try to write an 'easy' to follow story
 - E.g. "tell tell tell" technique:
 - What are you going to tell (intro)
 - Tell them (body)
 - What did you just tell (wrap-up, link to next section)

BAD EXAMPLE

Engine tests using *Chlorella vulgaris sp.* are reported by Makarevicienė et al. [33]. The algae oil used for biodiesel production contained 7.6% of saturated fatty acids, 64.9% of unsaturated and 27.5% of polyunsaturated fatty acids. A two-step transesterification procedure was performed in a laboratory reactor for biodiesel production. Fuel mixtures containing 30% (v/v) biodiesel fuel (rapeseed oil methyl esters or microalgae oil methyl esters) and 70% (v/v) diesel fuel were used. The tests were performed in a diesel generator onboard a ship. The engine runs on a wide range of fuels, including pure biodiesel. As a result, when running each engine load with 30% (B30) of biodiesel, the brake-specific fuel consumption was approximately 3-3.5% higher than that with diesel fuel. When the engine ran on B30, the stoichiometric constant decreased by 3-3.5%, from 14.24 kg air/kg fuel for diesel to 13.7- 13.83 kg air/kg fuel (B30). In a comparison with rapeseed oil biodiesel, the authors found no significant differences. Concerning the exhaust emissions, the conversion of a Valmet 320 DMG engine from running on diesel to running on B30 from algae reduced hydrocarbons by approximately 10% compared to B30 from rapeseed oil. When running on B30 from algae, the engine's thermal efficiency was 2.5-3% higher compared to diesel fuel. The main effect of the improvements made to the environmental indicators was related to the reduction of the smoke by 10-75% and the reduction of HC emissions by 5-25% compared to diesel fuel.

Another report was presented by Haik et al. [34]. The engine used was a Ricardo E6 single cylinder variable compression indirect injection diesel engine. The studied algae species were *Ankistrodesmus braunii* and *Nannochloropsis sp.* The combustion pressure was measured by a water-cooled piezo-electric pressure transducer. The study was carried out to cover different types of fuels (base diesel fuel, algae oil methyl ester, algae oil methyl ester blended with diesel at 50/50 ratio and raw algae oil). For each fuel the engine parameters were varied according to the following levels: engine speed between 1080-1800 rpm, engine injection between 20-45° before top dead center (BTDC), load output torque from 2-18 Nm and compression ratio varied from 18 to 22. Biodiesel exhibits the highest combustion pressure rise rate compared to raw algae oil and diesel fuel but also higher ignition delay. The methyl esters exhibited more combustion noise compared to the diesel fuel or raw algae oil. Biodiesel produced less engine torque output than the diesel case and raw algae oil and slightly higher heat release rate compared to diesel fuel. The authors found a non-direct correlation between engines performance and the amount of methanol used in the chemical process for biodiesel production.

BAD EXAMPLE

Engine tests using *Chlorella vulgaris* sp. are reported by Makarevicienė et al. [33]. The algae oil used for biodiesel production contained 7.6% of saturated fatty acids, 64.9% of unsaturated and 27.5% of polyunsaturated fatty acids. A two-step transesterification procedure was performed in a laboratory. The biodiesel fuel (rapeseed oil methyl esters or microalgae oil) was blended with diesel fuel. The tests were performed in a diesel generator onboard a ship. The engine performance was compared when running each engine load with 30% (B30) of biodiesel. The results showed that the engine performance was higher than that with diesel fuel. When the engine ran on B30, the specific fuel consumption was lower for diesel to 13.7- 13.83 kg air/kg fuel (B30). In a comparison, there were no significant differences. Concerning the exhaust emissions, the conversion of a Valmet 320 DMG engine from running on diesel to running on B30 from algae reduced hydrocarbons by approximately 10% compared to B30 from rapeseed oil. When running on B30 from algae, the engine's thermal efficiency was 2.5-3% higher compared to diesel fuel. The main effect of the improvements made to the environmental indicators was related to the reduction of the smoke by 10-75% and the reduction of HC emissions by 5-25% compared to diesel fuel.

Another report was presented by Haik et al. [34]. The engine used was a Ricardo E6 single cylinder variable compression indirect injection diesel engine. The studied algae species were *Ankistrodesmus braunii* and *Nannochloropsis* sp. The combustion pressure was measured by a water-cooled piezo-electric pressure transducer. The study was carried out to cover different types of fuels (base diesel fuel, algae oil methyl ester, algae oil methyl ester blended with diesel at 50/50 ratio and raw algae oil). For each fuel the engine parameters were varied according to the following levels: engine speed between 1080-1800 rpm, engine injection between 20-45° before top dead center (BTDC), load output torque from 2-18 Nm and compression ratio varied from 18 to 22. Biodiesel exhibits the highest combustion pressure rise rate compared to raw algae oil and diesel fuel but also higher ignition delay. The methyl esters exhibited more combustion noise compared to the diesel fuel or raw algae oil. Biodiesel produced less engine torque output than the diesel case and raw algae oil and slightly higher heat release rate compared to diesel fuel. The authors found a non-direct correlation between engines performance and the amount of methanol used in the chemical process for biodiesel production.

1 paragraph per paper

Basically summarizing paper

What's the added value?

GOOD EXAMPLE

J. Vancoillie et al. / Applied Energy 102 (2013) 140–149

“The elevated flame speed and wide flammability limits of alcohols open some alternative options for load control, especially for methanol. Pannone and Johnson [12] have published results from an experimental turbocharged lean-burn methanol engine. The reported brake thermal efficiencies are up to 14% better than for stoichiometrically fuelled engines with throttled load control [15]. Engine-out CO emissions were reduced by over 50%, while unburned fuel emissions mildly increased. The tailpipe NO_x penalty of the lean burn strategy reached up to 150%, making the practical use of such a strategy questionable.”

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em Highlighting what's important for your problem/goal statement,
rea comparing to other results (= new information)

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Giving your own judgment / adding implications

A TOOL: “CARS”

CARS – ”Creating A Research Space”

- A tool for writing an introduction that works*
 - Move I: Establishing a research territory
 - Move II: Establishing a research niche
 - Move III: Occupying the niche

* Swales, JM and Feak, CB, Academic writing for graduate students, 2nd Ed. Ann Arbor: University of Michigan Press (2004)

ESTABLISHING A RESEARCH TERRITORY

- Show that the general research area is important, central, interesting, problematic, or relevant in some way:
 - *”In light-duty (LD) diesel engines, combustion noise levels need to be mitigated to fulfill customer expectations and legal requirements...”*
- Introduce and review items of previous research in the area:
 - *”Some early studies used a pilot injection dwell of around 50 CAD, which is very large by modern standards...”*

ESTABLISHING A RESEARCH NICHE

- Indicate a gap in the previous research, or a need to extend previous knowledge in some way
 - *“While the effects of single pilot dwell spacing have been studied, there is a gap in research regarding multiple closely-coupled pilot injections which still feature a distinct main injection...”*

OCCUPYING THE NICHE

- Outline the purpose of your study
 - *”This work is an investigation into what implications these closely-coupled triple-pilot strategies have on the heat release process...”*
- List research questions or hypotheses
 - *”The hypothesis is that the heat release rate is the factor controlling the combustion noise...”*
- Announce principal findings
 - *”It was found that the frequency of the HRR peaks determines the strongest noise frequencies.”*

OTHER APPROACH

1. Motivation
2. Research problem
3. Research question

OTHER APPROACH

1. Motivation

- Tell the reader why your research problem is important or interesting. E.g.:
 - *“We must limit combustion noise from light-duty diesel engines to fulfill customer expectations and future legal requirements – if we don’t, the diesel engine is dead.”*
 - *“PPCI yields low PM and NO_x emissions, but due to the high levels of EGR, the UHC emissions are usually high. This could be a showstopper for this promising technology.”*

OTHER APPROACH

2. Research problem

- The research you present addresses a research problem. To motivate your research, you must establish this problem for the reader!
- It is usually a "knowledge gap" – something that is not known
 - Tell us how others have studied your problem area
 - Establish the gap by telling us what they didn't study
 - This helps us understand why you study it now...

OTHER APPROACH

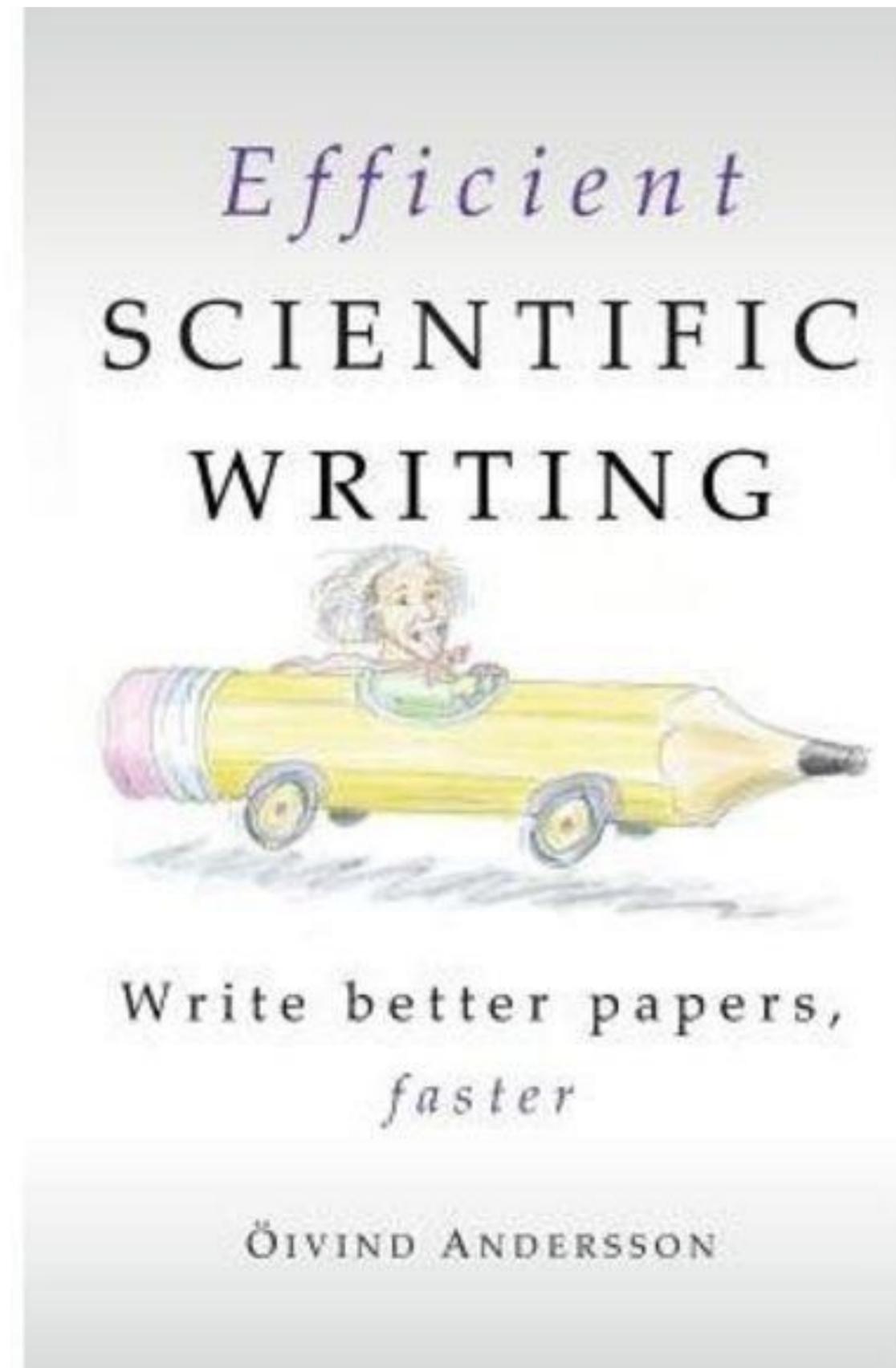
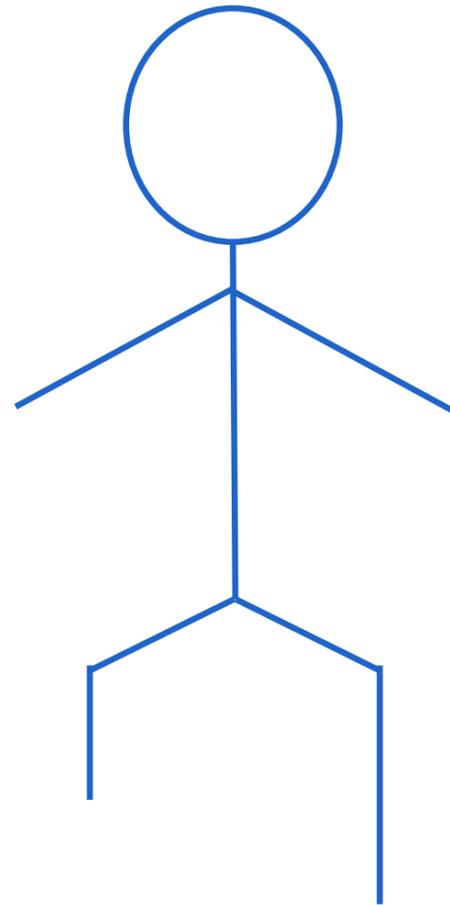
3. Research question

Formulate the question/hypothesis/goal. (It doesn't have to be formulated as a question.) What drives your specific experiment/study? For example:

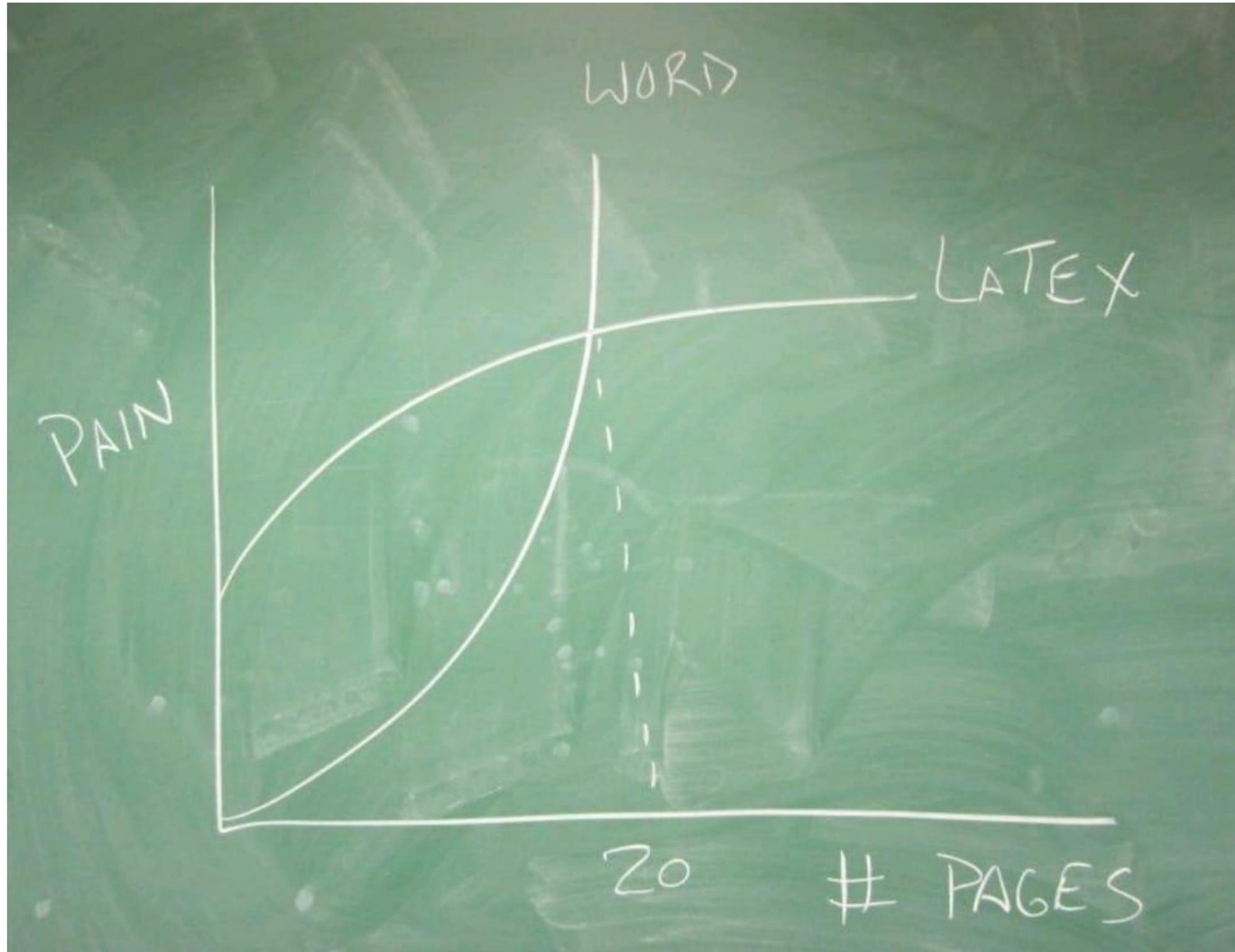
- *"The hypothesis is that the shape of the heat release rate determines the combustion noise of the engine"*
- *"I will present in-cylinder PLIF distributions of UHC obtained under typical PPCI conditions to clarify the sources of UHC emissions in PPCI combustion systems"*

TIP

- Booklet highly recommended
- E.g.: make yourself a map, a blueprint, a “strawman draft”
... before you start writing in earnest



TIP: WORD PROCESSOR



FINAL NOTE: OUR EXPECTATIONS

- Supervisors may contact you concerning different focus
 - Extensive literature review, or most recent findings combined with initial experimental results, ...
- 17 Nov: “strawman draft” of literature study
 - 1 or 2 pages: covering sections and storyline
 - You get feedback within a day if we spot issues (e.g. wrong focus)
- 1 Dec: full version
 - You get feedback before Xmas
 - Depending on number of comments, we might ask for a reworked version by 2nd semester
- This is intended for you to get started reading asap, and writing asap – these things need practice! Getting feedback increases your learning.

AI?

- All of the above was made before the rise of generative AI!
- Check [Generatieve AI in het UGent-onderwijs — Studentenportaal — Universiteit Gent](#) and [ai_2425.pdf \(ugent.be\)](#) (so far both only NL)
- Bottom line: you can use it “responsibly”
 - But there are pitfalls
 - And you have to document it
 - And there might come additional requirements as supervisors get to grips with it (to be continued...)
 - And there will be extra checks on your own contribution (cfr. new thesis evaluation rules and “thesis exam”)

STILL QUESTIONS?

- Go to <https://www.ugent.be/ea/eemmecs/en/education/stfes/master-thesis>
- Ask your supervisor
 - Preferably not: “How should I do this?”,
but rather: “Would *this* be the best approach?”

Sebastian VERHELST

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AND METAL ENGINEERING

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<https://www.ugent.be/ea/eemmecs/en/research/stfes>