一般社団法人 人工知能学会
The Japanese Society for Artificial Intelligence

YAHOO! JAPAN

2020年度 人工知能学会全国大会　チュートリアル

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－段階的アプローチ－

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Tech Writing May not be Easy

You'll be surprised to see invited speakers are often bad in presentation.

- 'Cause you do not know how. Neither, does your boss! You should know the most **efficient** way
- Lectures/books teach what, but not how
- This talk teaches how you should proceed
- Most common/serious problem is the logic
- Highlights logic building as an extract of the whole talk
- Examples are provided for easy understanding

Goal of Paper Writing

To have it **accepted** for presentation/publication

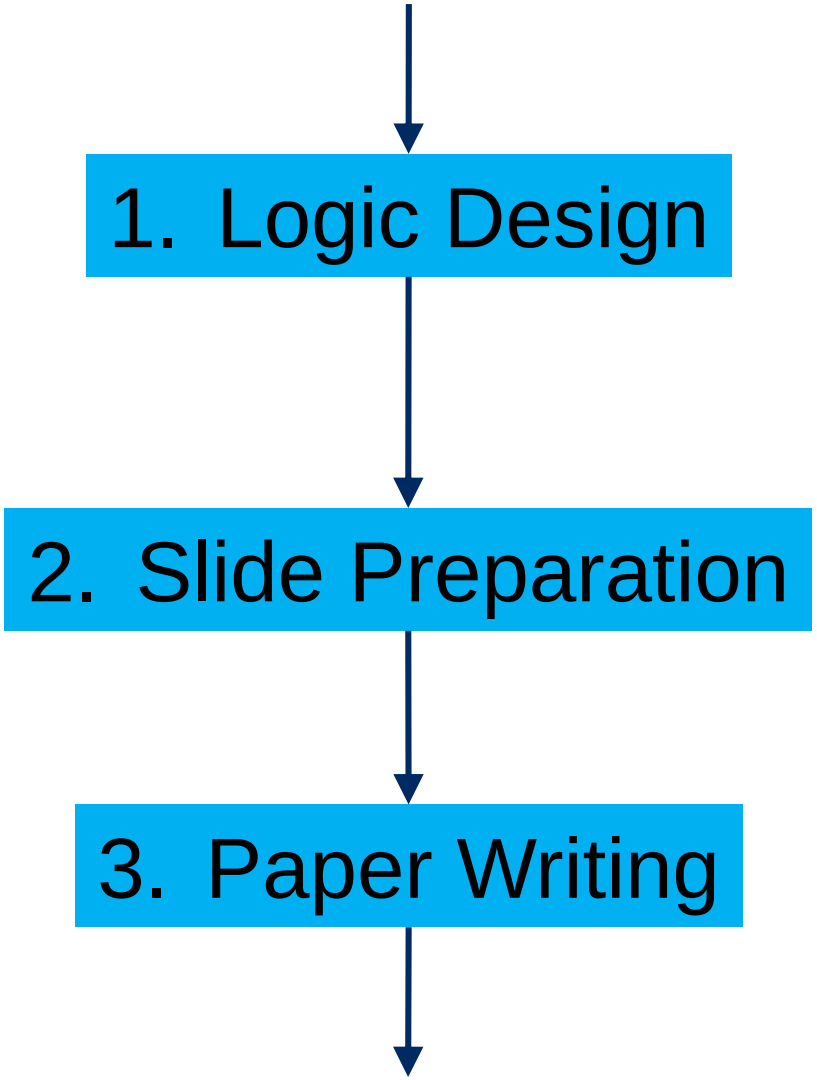
- Be kind for reviewers
  - Busy, maybe non-experts
- Reviewers try to identify/seek for
  1. Novelty/Originality (new app OK)
     - Value and Trick (What and How)
     - Logic design (Good logic)
  2. Experimental Validation (How good)
     - Visibility for quick understanding
     - Graph (& big font) rather than Table
     - Comparison w/ the conventional

Efficient Paper Writing

1. Read **tech writing books**. Practice what are written
2. **Slide first**. Assume a lecture.
   - Font size ≥ 24 pt
   - To eliminate redundancy and highlight the logic
3. **Good logic** is the key to the success

- Easy to follow. (no question/rethinking)
- Possible to predict the next content

Process to the Success



3-point Analysis
- Value
- Trick
- Problem

Page allocation
Order of preparation

Grow each slide to a section

3-Point Analysis

1. Value of the Paper

2. Trick to achieve the value

3. Problem solved

Title of the Paper

Topic sentence of Abstract

4. Most relevant research

3-Point Analysis Sheet

What is the **Value** (**First in the world**)?

A.

What is the **Trick** to achieve the value?

B.

What is the solved **Problem**?

C.

Use the same font size (36 pt), never make box big.

Value

Value: Benefit/Achievement/Contribution

How/By what (with what)
does the result make users happy?

- Enable something (new function)
- Better performance (accurate, stable)
- Versatile (wide application)
- Quick start-up
- Structure/Algorithm (production/calcul./maintenance)
  - Simple
  - Parallel
  - Regular/Symmetry

Trick

Trick: Solution to bring the Value

Should naturally lead to the Value

- New component
- New measure/index
- New process
- New/equivalent model/structure
- New cost (in optimization)
- New ingredient(s)
- Redundancy removal
- ..

Problem

Problem: Opposite to the Value

- Problem is identified in the most relevant research
- Problem (totally new) may be identified in an application
  - Multiple relevant research may exist
- Value is obtained when the Problem is gone

Sheet for “Solved Problem”

What is the opposite to the Value (A)?

Express it w/ A+no or not.

D.

Express D w/o no or not.

E.

E may not exist.

Use the same font size (36 pt), never make box big.

Title of the Paper

Title w/ Value (A) and Trick (B)

F=A+B or B+A, may use up to one conjunction

F

Title w/ all or a part of A, B, and C (new)

if use of C **makes the title better than F**

G

Use the same font size (36 pt), never make box big.

Topic Sentence of Abstract

Topic sentence using the Paper Title

This paper proposes/presents

followed by the title.

This paper proposes/presents

Use the same font size (36 pt), never make box big.

Most Relevant Conv. Research

Conventional research which has the Problem.

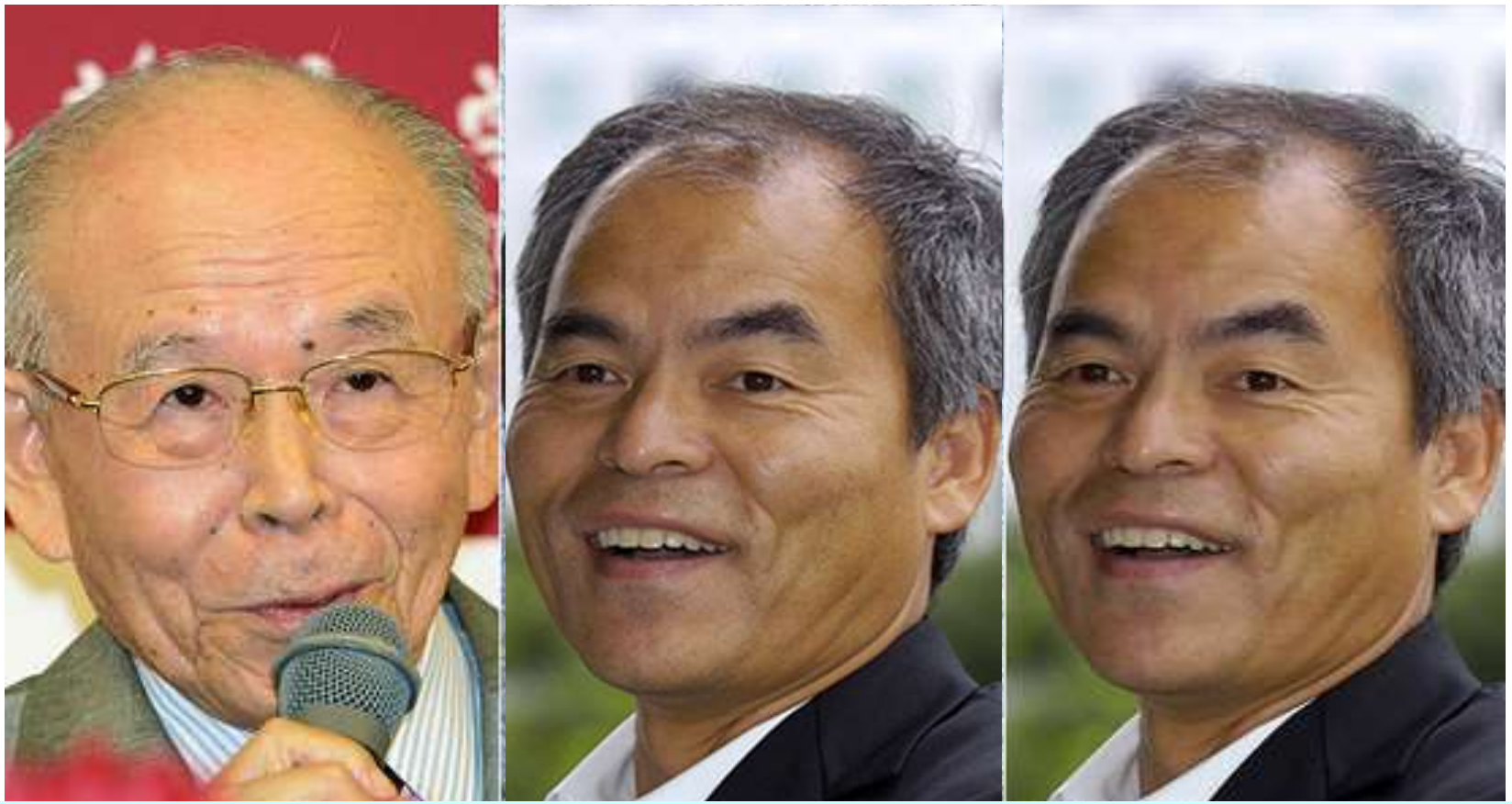
1st author

Title starts w/

Reference（conference/journal） w/ month/year

Use the same font size (36 pt), never make box big.

Example: Problem-Value Pair

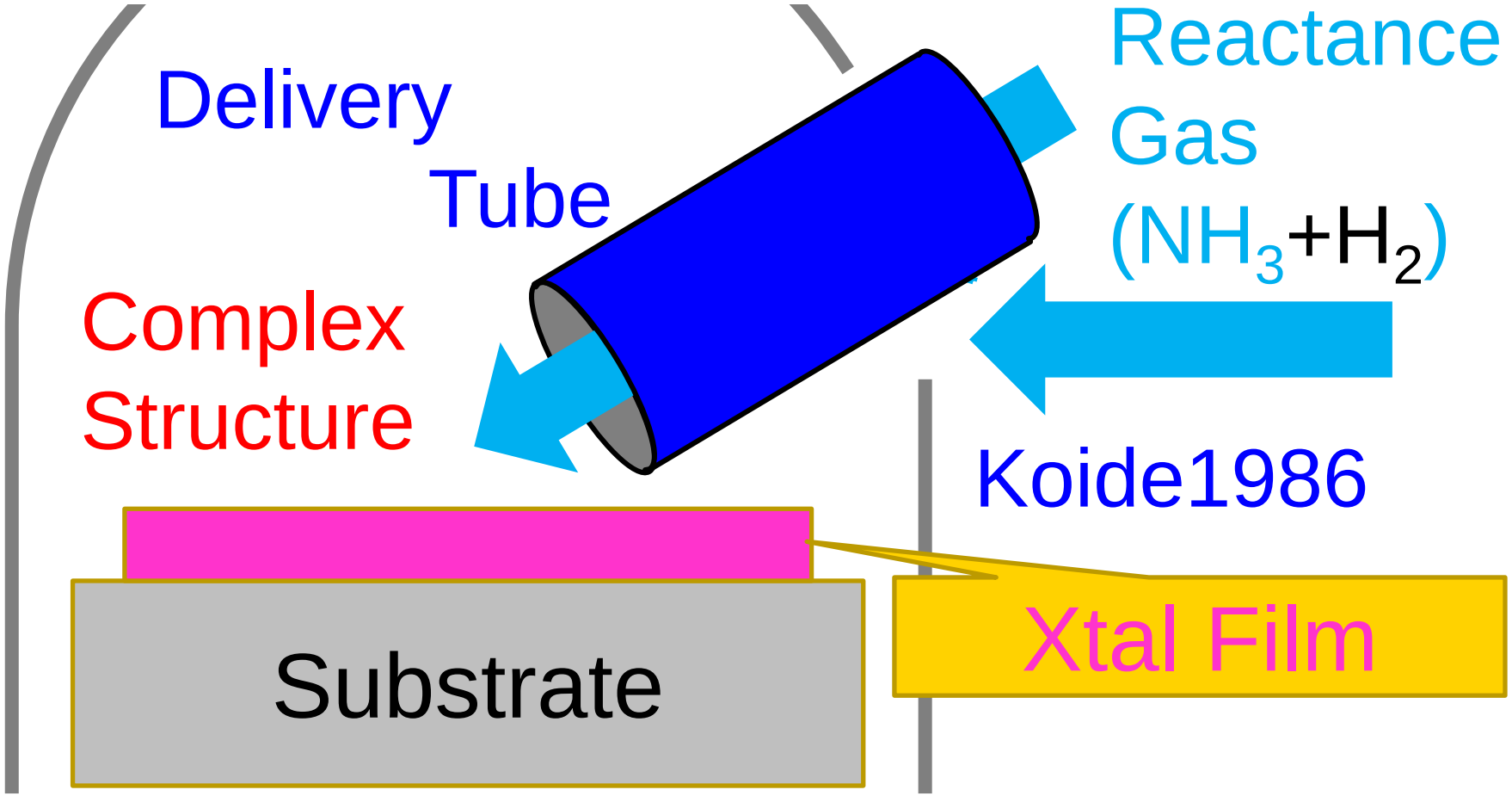


Blue Laser Diode :
2014 Nobel Prize in Physics

Source: Wall Street Journal
https://jp.wsj.com/articles/SB12645916890387823719904580199923020778284

Problem and Solution (Koide1986)

MOCVD
(Metalorganic Chemical Vapor Deposition)



3-Point Analysis (Koide)

What is the **Value** (**First in the world**)?

A. Blue LD xtal fabrication by MOCVD

What is the **Trick** to achieve the value?

B. NH_3 delivery by tube

What is the solved **Problem**?

C. No blue LD xtal fabrication by MOCVD

Use the same font size (36 pt), never make box big.

“Solved Problem” by Sheet

What is the opposite to the Value (A)?

Express it w/ A+no or not.

D. No fabricationtion of blue LD crystal

Express D w/o no or not.

E. Blue LD crystal was not fabricated

E may not exist.

Use the same font size (36 pt), never make box big.

Problem & Solution (Toyota's 5 Why's)

Find the **root** cause of the problem to fix it.

Problem → 1st Why → 2nd Why → 3rd Why → 4th Why → 5th Why

- Problem
- 1st Cause
- 2nd Cause
- 3rd Cause
- 4th Cause
- 5th Cause

Tai'Ichi Ohno
former EDP

http://www4.tokai.or.jp/advi-qc/p01.htm

Source: Japan Automotive Hall of the Fame, http://www.jahfa.jp/2007/01/01/大野-耐一/

Problem: Crystal is not fabricated
Cause 1: Reactance gas is not delivered
Solution: Gas delivery by delivery tube

In Search of Further Cause

Find the **root** cause of the problem to fix it.

Problem 1st Why 2nd Why 3rd Why 4th Why 5th Why

1st Cause

2nd Cause

3rd Cause

4th Cause

5th Cause

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Source: Japan Automotive Hall of the Fame, http://www.jahfa.jp/2007/01/01/大野-耐一/

Problem: Crystal is not fabricated

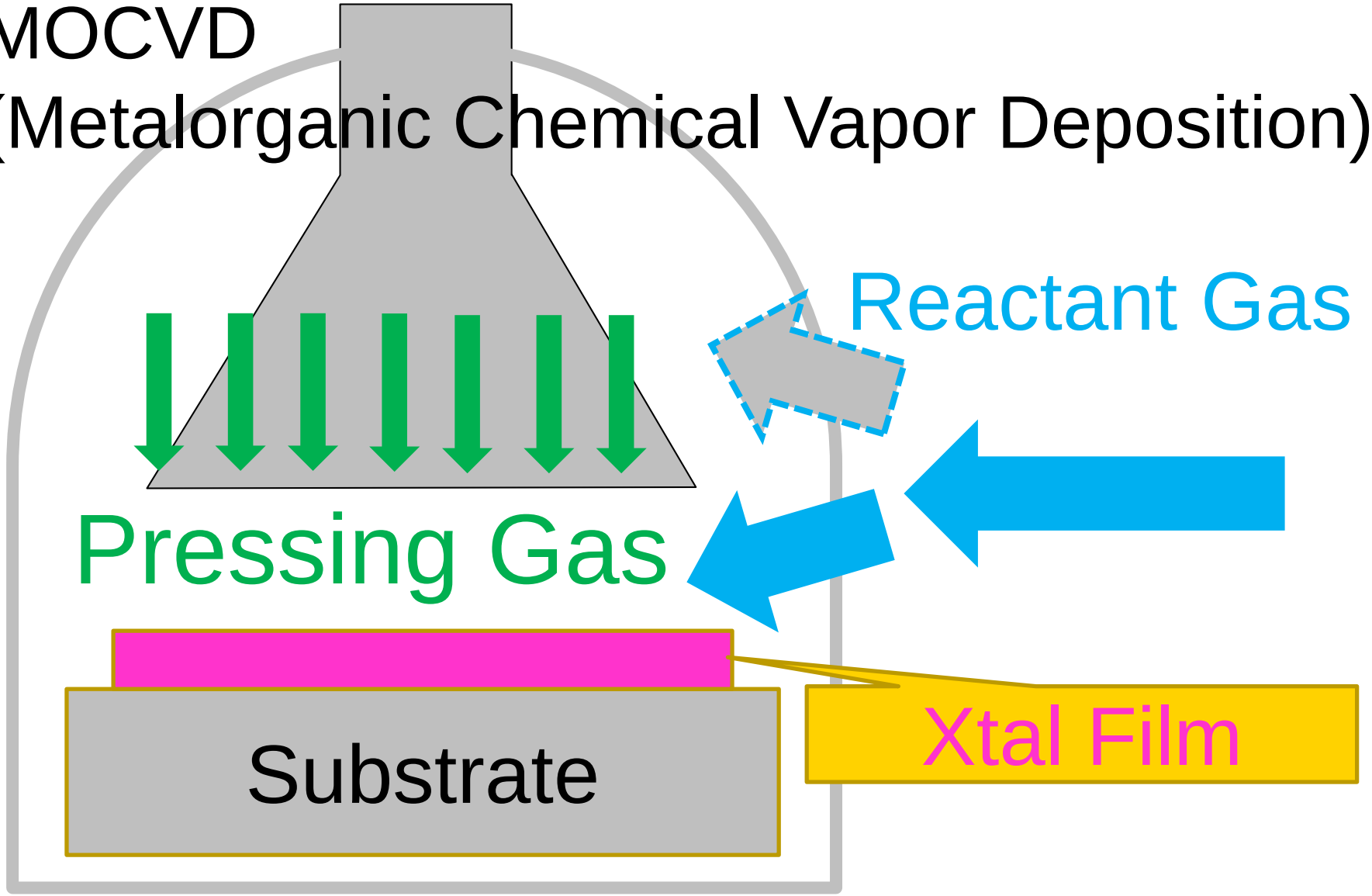
Cause 1: Reactance gas is not delivered (Why?)

Cause 2: Reactance gas goes up

Solution: Gas delivery by **pressing gas**

Problem & Solution (Nakamura1991)

MOCVD
(Metalorganic Chemical Vapor Deposition)



3-Point Analysis (Nakamura)

What is the **Value** (**First in the world**)?

A. Blue LD xtal fabrication by MOCVD

What is the **Trick** to achieve the value?

B. NH_3 delivery by pressing gas

What is the solved **Problem**?

C. Delivery tube in blue LD xtal fabrication

Use the same font size (36 pt), never make box big.

“Solved Problem” by Sheet

What is the opposite to the Value (A)?

Express it w/ A+no or not.

D. No fabrication of blue LD crystal

Express D w/o no or not.

E. Blue LD crystal was not fabricated

E may not exist.

Use the same font size (36 pt), never make box big.

Title of the Paper

Title w/ **Value** (A) and **Trick** (B)

F=A+B or B+A, may use up to one conjunction

F

Blue LD crystal fabrication by MOCVD

with NH_3 delivery by pressing gas

Title w/ all or a part of A, B, and C (new)

if use of C **makes the title better than F**

G

Use the same font size (36 pt), never make box big.

Topic Sentence of Abstract

Topic sentence using F or G

This paper proposes/presents

followed by the title (F or G)

This paper proposes/presents

Blue LD crystal fabrication by MOCVD

with NH_3 delivery by pressing gas

Use the same font size (36 pt), never make box big.

Most Relevant Conv. Research

Conventional research which has E or D.

1st author Y. Koide

Title starts w/ Epitaxial growth and properties

Reference（conference/journal） w/ month/year

J. Electrochemical Society, Sep. 1986

Use the same font size (36 pt), never make box big.

Slide First!

- Page allocation
- Logical design
  - Establish a good “problem-value” pair

    Paired words often help
- Select figures and tables to use
- Fill in necessary information in each page
- Balance slide allocation and each slide
- Reorder slides to modify logic (easy)

Paired Words for Value/Problem

Negative words for the problem	**Positive words for the value**
computations	efficient
inefficient	compact
	low complexity
	low power
slow convergence	fast convergence
degraded	good
	superior
no analytical support	analysis
no implementation	implementation

Page Allocation

How many pages for what?

Usually, 10-15 pages（Let's assume 10 pages）

- Page 1: Background (Relevant research)
- Page 2: Most relevant research
- Page 3: **Problem** of most relevant research
- Page 4: **Trick** and rationale of the solution
- Page 5-6: Details of the solution
- Page 7-9: Evaluation (conditions and results)
- Page 10: Conclusion/Summary (**Value**)

Order of preparation

- Which page to start with?
- Page 5-6: Details of the solution
- Page 4: **Trick** and rationale of the solution
- Page 3: **Problem** of most relevant research
- Page 2: Most relevant research
- Page 7-9: Evaluation (conditions and results)
- Page 1: Background (Relevant research)
- Page 10: Conclusion/Summary (**Value**)

Design of Introduction

Go Backward

1. 2nd-to-the-last paragraph
   = Most relevant conventional research
   a. Value of most relevant conven. research
   b. Trick of most relevant conven. research
   c. Problem of most relevant conven. research
   ⤷ = the Solved Problem
2. Trace back introduction w/ research history
   a. Repeat Value/Trick/Problem in each paragraph
3. General applications (w.r.t. daily life) to appear in Paragraph 1

What go to the Last Paragraph?

1. Topic sentence
   - Copy from Abstract
2. Description of sections
   - Describe what appears in each section
   - Patterns:
     - Location + Description
       - In the following section, xx is described
     - Description + Location (reversed order)
     - Section # + verb
       - analyze, describe, discuss, explain, introduce, present, propose, provide, reveal, show, unveil, …..

Construction of Introduction

How the value benefit the daily life

Applications

Background: Paper position w/ past papers

Problem

Most relevant method has xxx problem.

A. ”Who,” (“When,”) did “what,” and how it was.
B. features/contributions
C. Unsolved problem(s)

This paper proposes …. In the next section, ……

Abstract

1. Topic Sentence
2. Trick + Effect (single sentence)
   - Effect is the other side of a coin for Problem
3. Trick details (≤ 2 sentences)
   - Rationale (Why trick works)
4. Evaluation
   a. Single sentence
   b. Numerical values
   c. Comparison w/ the conventional

Present Tense

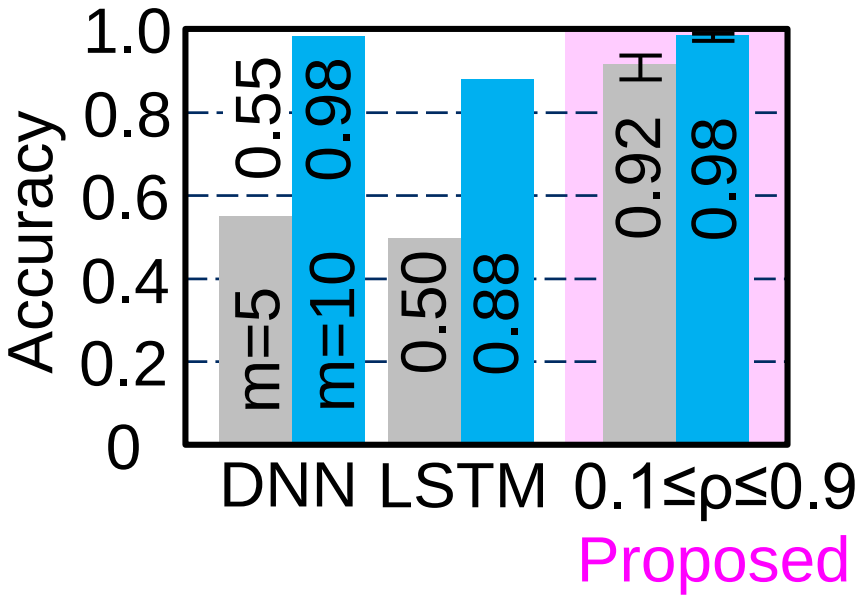
Do You Start w/ Problem?

65% of papers start w/ a problem or even a research history

- Busy reviewers read:
  1. Abstract for the **Trick** and results
  2. Introduction (2toL para) for the **Problem**
  3. Evaluation for validation
- Not recommended
  1. No info on Novelty/Originality
  2. Busy reviewers are frustrated
  3. Space is wasted on the **Problem**
  4. Lack of info on the **Trick**

Table to Graph : Effect

1. Graph appeals to the sight
2. Graph speaks by itself
3. Visibility saves (reviewes') time
4. Reviewers will be happy
5. You will receive a high score!



No message sacrificed

1. Better than Conv
2. Versatile (insensitive to m)
3. Insensitive to ρ

Graph Check Sheet

- ☐ Chart appropriate for the data (line/pie/bar) ?
- ☐ Chart designed to best convey message?
- ☐ A label given to ordinate/abscissa?
- ☐ Minimum 24pt in font size?
- ☐ Font size of scale ≥ Font size of body?
- ☐ Scale notch spacing sufficient?
- ☐ Different line thickness for highlight?
- ☐ Legend inside the figure?
- ☐ Attention paid to colors of lines and labels?

Summary

- Slide first
  - Establish a good logical structure
- 3-point analysis to identify Value, Trick, and Problem
  - Relate Value and Problem (=Opposite)
- Attention to good logical structure
  - Easy to follow（No question/rethinking）
  - Possible to predict what appears next
- Use graphs rather than tables

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