

Dagstuhl Seminar 26421 Draft Programme

Advancing Testability and Verifiability of CPS with Neurosymbolic and Large Language Models

12–16 October 2026 | Schloss Dagstuhl, Germany

Plan for the week

Day	Focus
Monday - Align	Introductions, cross-community overviews, confirmation of topics and working-group roles.
Tuesday- Plenary	Open-problem talks and discussion across the five tentative topics.
Wednesday - Roundtable and hike	Industry perspectives, intermediate group reports, topic review and informal discussion.
Thursday - Breakout discussions	Topic groups work independently throughout the day and prepare agreed outputs.
Friday - Commit and conclude	Group reports, merge of outcomes, roadmap, publication plan and responsibilities.

Tentative working topics

ID	Topic	Scope
T1	Formal Specification Mining and Alignment	Exploring how LLMs and neurosymbolic methods can derive and align specifications for testable and verifiable CPS.
T2	Specification-Guided Design and Synthesis	Investigating how LLMs and neurosymbolic methods can use formal specifications to guide the design and synthesis of testable and verifiable CPS components.
T3	LLM-Driven Test Generation	Examining how LLMs can generate effective test scenarios to improve CPS coverage and reveal failures.
T4	Runtime Monitoring, Verification, and Cybersecurity Incident Detection and Treatment	Exploring how LLMs and neurosymbolic methods can support runtime monitoring and verification of CPS behaviour and facilitate cybersecurity incident detection and treatment.
T5	Integrated LLM–Neurosymbolic Pipelines	Exploring how LLM and neurosymbolic capabilities can be integrated to support scalable, explainable, testable and verifiable CPS.

Timing. Morning coffee is scheduled at 10:30–11:00, coffee and cake at 15:30–16:00, lunch at 12:15 and dinner at 18:00. The programme remains adjustable during the seminar.

Monday 12 October - Align

Focus: Introduce all participants, establish common ground and confirm the five working topics and group roles.

Time	Session	Purpose
09:00–09:15	Welcome	Seminar purpose, programme and practical arrangements.
09:15–10:30	Participant introductions I	One slide and three minutes per participant, with approximately one minute allowed for transition.
10:30–11:00	Coffee break	
11:00–12:15	Participant introductions II	Complete the introductions for all 33 registered participants.
12:15–14:00	Lunch	
14:00–15:30	Cross-community overviews	Three overviews. Each has 20 minutes for the overview and 10 minutes for discussion. Moderated by Simin Nadjm-Tehrani.
15:30–16:00	Coffee and cake	
16:00–17:00	Confirm working topics	Review and confirm the five topics, including any required changes or overlaps.
17:00–17:45	Confirm group roles	For each topic, confirm a facilitator who will lead and document the discussion. The facilitator will also coordinate the report writing unless the group selects another volunteer for that role.
18:00	Dinner	

Tuesday 13 October - Plenary

Focus: Hold intensive open-problem talks with all participants together and refine the questions for each topic.

Time	Session	Purpose
09:00–10:20	Topic 1 open-problem talks	Three available talks. Each talk has 10 minutes for presentation and 10 minutes for discussion, with 20 minutes retained for topic-level discussion and transition.
10:20–10:30	Buffer	Close the session and record the main questions and tentative answers.
10:30–11:00	Coffee break	
11:00–12:15	Topic 2 open-problem talks	Two available talks, each followed by equal discussion time. Remaining time is for topic-level discussion and transition.
12:15–14:00	Lunch	
14:00–15:20	Topic 3 open-problem talks	Three available talks. Each talk has 10 minutes for presentation and 10 minutes for discussion, with 20 minutes retained for topic-level discussion and transition.
15:20–15:30	Buffer	Close the session and record the main questions and tentative answers.
15:30–16:00	Coffee and cake	
16:00–17:00	Topic 4 open-problem talks	Two available talks, each followed by equal discussion time. Remaining time is for topic-level discussion and transition.
17:00–18:00	Topic 5 open-problem talks	Two available talks, each followed by equal discussion time. Remaining time is for topic-level discussion and transition.
18:00	Dinner	

Guidance for open-problem talks

These are not conference-style presentations. Speakers should define an important open problem, present current ideas, evidence and tentative answers, and identify the points that need collective discussion. Slides should be concise.

Slides: Participants are encouraged to upload their slides to the seminar materials website using their personal DOOR credentials: <https://www.dagstuhl.de/Materials/26421>

Wednesday 14 October - Roundtable and hike

Focus: Add specific industry perspectives, review interim progress and decide whether topics should be retained, changed or merged.

Time	Session	Purpose
09:00–10:30	Industry roundtable	Industry participants comment on questions raised during Tuesday's open-problem talks and explain practical needs, constraints and main challenges faced by industry.
10:30–11:00	Coffee break	
11:00–11:45	Breakout discussions	Each topic group consolidates its current position and prepares a short intermediate report.
11:45–12:15	Intermediate reports (Plenary)	Each group gives a brief 2–3-slide oral presentation summarising its initial discussion, key challenges, preliminary ideas and proposed next steps.
12:15–13:30	Lunch	
13:30–15:30	Hike or outing	Informal discussion. Details to be confirmed with Schloss Dagstuhl.
15:30–16:00	Coffee and cake	
16:00–17:45	Casual discussions and organisers' review	Participants continue informal discussions, while the organisers separately review the intermediate reports and consider possible topic changes or mergers.
18:00	Dinner	

Thursday 15 October - Breakout discussions

Focus: Allow each confirmed topic group to work independently and complete the agreed outputs.

Time	Session	Purpose
09:00–09:30	Plenary topic realignment	The organisers present their review of the intermediate reports, and all participants discuss and confirm any changes or mergers to the topics.
09:30–10:30	Breakout discussions I	Each facilitator manages the session according to the needs of the group.
10:30–11:00	Coffee break	
11:00–12:15	Breakout discussions II	Continue topic work and record decisions, document key findings and unresolved points.
12:15–14:00	Lunch	
14:00–15:30	Breakout discussions III	Develop the group output and identify potential connections to the other topics.
15:30–16:00	Coffee and cake	
16:00–17:45	Breakout discussions IV	Complete the group report and prepare Friday's presentation.
17:45–18:00	Daily check	Facilitators confirm that their outputs and presentation are ready.
18:00	Dinner	

Expected output from each group. A concise report covering the problem, current ideas, proposed solutions, key insights, relevant benchmarks, links to other topics, contributors and next steps.

Friday 16 October - Commit and conclude

Focus: Report the breakout outcomes, agree an integrated roadmap and assign responsibilities and delivery dates.

Time	Session	Purpose
09:00–10:30	Breakout group reports	Each group facilitator presents the agreed outcomes, open issues, proposed contribution and next steps.
10:30–11:00	Coffee break	
11:00–12:00	Merge outcomes and agree roadmap	Agree how the five topic outputs fit together. Confirm the intended submission venue, delivery timeline, lead coordinator, section leads and contributors.
12:00–12:10	Closing remarks	Summary from the organisers and confirmation of immediate actions.
12:10–12:15	Final check	Confirm report responsibilities and contact points.
12:15	Lunch and departure	Seminar concludes.