WG21 November 2025 Kona Hybrid meeting
Minutes of Meeting

ISO/IEC JTC1 SC22 WG21 N5031— 2024-11-28
Nina Dinka Ranns, dinka.ranns_at_gmail.com

Chair: John Spicer

03-09 November 2025, Kona, HI, USA

1. Opening activities

John Spicer opens the meeting at 08:34 AM UTC-10.

There is a film crew on-site during the week. They are not a part of this meeting. They will not participate in the ISO meeting.

This is the first ballot resolution meeting for C++26. Everything in the CD already has consensus. Any changes we make at this stage should increase consensus.

This is Herb Sutter's last meeting as the convener. Herb thanks the room for the support.
Guy Davidson will be the convener at the next meeting. Guy thanks the room for the support.

LEWG will start with a joint session with SG1. LEWG may not be able to go through all the NB comments during the week. We will process them in between meetings in our regular zoom meetings.
Zoom links have changed, please check the wiki for the updated links.
LEWG will discuss standard library hardening after EWG discusses contracts related NB comments

1.1 Opening comments, welcome from host

John Spicer welcomes the group.

Welcome from the host.
Thank you to the host.
Thank you to the sponsors.

1.2 Meeting guidelines

John Spicer presents.

We have a wiki that contains meeting specific information. Please do not edit the wiki unless you have been explicitly instructed to do so. If you are attending for the first time, please see the

page for new committee members.

We also have a github tracker. Please do not update github issues unless you have been explicitly instructed to do so by the relevant chair. Contact Nina Ranns if you need access to the github.

Please speak into the microphone so people participating over Zoom can hear. Please introduce yourself when speaking.

Meetings are not public, we want everyone to be able to speak freely. Please refrain from live tweeting, blogging, taking photos of other people's screens or recording the meetings. You're allowed to take screenshots of presentations for your personal use. You can quote aggregate polls and decisions after the meeting.

Agenda is on the wiki.

Every participant is responsible for understanding and abiding by the following:

> The ISO Code of Conduct
> The IEC Code of Conduct
> The WG21 Practices and Procedures, and Code of Conduct

Documents are on the wiki. Please get familiar with them. They also include a description of the process we follow.

You are expected to abide by the rules of the code of conduct of your respective NB.

Should you at any point find yourselves overwhelmed or needing advice on an uncomfortable situation, do not hesitate to approach a WG21 officer : Herb Sutter, John Spicer, or Nina Ranns. If you can't find them, send them an email and they will be in touch.

For plenary polls, you have to be in the ISO global directory to vote. One person, one vote. In working groups and study groups everyone can vote. Please refer to the best practices in the WG21 document - e.g. do not vote unless you are familiar with the issue.

The attendance sheet is live. You can find it on wiki, mattermost, and posted to the reflector. If you have registered, it's pre-populated with your information. Please mark your attendance. If you have any issues, let Nevin Liber know.

If you need a paper number, please contact Nevin Liber.

John Spicer explains voting procedure for remote and in person attendance.

1.3 Introductions

Introduction of the WG21 officers.
Introduction of admin support roles.
Introduction of the subgroup chairs.
First time attendees introduce themselves.

1.4 Agenda review and approval

John Spicer presents the agenda and timings for the week.

The primary goals of this meeting will be:
Address national body comments on C++26 features

Additional, lower-priority goals include:
Subgroup work that may target versions after C++26

Motion to approve the meeting agenda.
No objections.
Approved.

1.5 Editor's reports, approval/adoption of working drafts

Document	Editor's report	Prospective WD
C++ 26 Working Draft	N5015	N5014

Motion to approve the documents above.
No objections.
Approved.

1.6 Approval of the minutes of the previous meetings

Meeting	Minutes
WG21 Sofia	N5016
WG21 pre-Kona administrative telecon	N5029

Motion to approve the documents above.

No objections.
Approved.

2. Liaison reports, and WG21 study group reports (see pre-meeting WG21 telecon minutes)

No discussion.

3. WG progress reports (Core, Evolution, Library, Library Evolution; see pre-meeting WG21 telecon minutes)

No discussion.

4. New business requiring action by the committee

No new business.

5. Organize working groups and study groups, establish working procedures

Jens Maurer presents room assignments.

Jens Maurer presents local amenities.

Room assignments are on the wiki page. Any questions or issues with remote attending setup, please find Jens Maurer.

6. Subgroup sessions

The subgroup chairs must arrange for any proposals to be written up in the form of a motion, and made available by 8:00 PM Friday on the straw polls page. Groups are encouraged to make polls available as soon as possible during the week so people can have time to review them. Please keep informed so you can raise any issues or concerns early.

If you have any questions or issues, please bring them up to attention as soon as possible. on reflector, mattermost, or one of the subgroup chairs.

We will have two vice conveners going forward: Jeff Garland and Nina Ranns.

We are looking for a new committee secretary. Please contact Guy Davidson. Nina Ranns can answer any question on what the role entails.

7. Review of the meeting

Reminder: Make sure you have marked the attendance sheet, if you have not already done so.

Subgroup status and progress reports. Presentation and discussion of proposals to be considered for consensus adoption by full WG21.

SG1: Concurrency (Giroux/Boehm/Arutyunyan)

SG1 met for four days during the week.
This was the first meeting in about 10 years without Olivier, but we made it.
Thank you to everyone for attending. The room was collaborative, productive, and disciplined
Minute-taking worked very well: there was always a volunteer scribe.

SG1 handled NB comments, issues, and papers for C++29.
Main topics:
- Senders and Receivers - this consumed the vast majority of SG1's time.
- Synchronization
- Parallelism
- Atomics

We started with a joint session with LEWG on Monday. The goal was to resolve the most critical senders/receivers issue that an NB comment had flagged. This issue was especially urgent because all other NB comments on senders/receivers depended on it. The joint session went well: SG1 and LEWG gave a clear direction they liked and asked the paper author to come back with revised wording. After the joint session SG1 continued as usual.

Eric Niebler gets "Truth and Transparency" award :
- He drove the issue.
- Was transparent about the problem.
- Took the risk that senders/receivers might be pulled if the problem wasn't solved.
This is an example of how we want people to operate: be honest, transparent, and do what's right even when it risks your own feature.

Outcomes:
- Almost all NB comments on senders/receivers were processed and forwarded. A few need to come back with a paper revision.
- All other NB comments were processed and do not need to be seen by SG1 again (unless there is new information)

- All issues assigned by the Library Working Group to SG1 were completed.
- For C++29-oriented work, SG1 made progress and gave feedback. SG1 did not kill any papers; everything continues with guidance.
- SG1 looked at the White Paper about Transactional Memory and approved it. White Paper process is new for C++ committee overall, so we agreed that it's up to the author to figure out the next steps.

SG4: Networking (Snyder/Ažman)

SG4 did not meet this week.

SG6: Numerics (Kretz/Lippincott/McFarlane)

SG6 Numerics met for one and a half day with relatively large attendance.

We looked at 5 integer related papers on Wednesday. Topics included bit operations, rounding options for division, and bit-precise integers. All 5 of the papers were forwarded to LEWG.
On Thursday we switched gears to complex and real numbers. 4 papers got feedback and need to return to us. A paper on constexpr floating-point <charconv> was forwarded to LEWG.

Thanks to the scribes and all attendees for six productive sessions!

SG7: Compile-time programming: (Dusíková/Snyder)

SG7 did not meet this week.

SG9: Ranges (Müller/Laine)

SG9 met in Kona on Tuesday morning and most of Thursday.

We discussed all four NB comments relevant to std::ranges. We recommended that LEWG adopts two, partially adopts one, and rejects one.

We also forwarded five papers to LEWG for C++29:

- P3411R4 "any_view" adds a type-erased view, allowing users to take and accept arbitrary views in non-templated functions.
- P3351R3 "views::scan" adds a view that computes a scan, e.g. a running sum of the input values.
- P3735R0 "partial_sort_n, nth_element_n" adds new safer variants of partial_sort and nth_element that take an integer instead of a (potentially out of bounds) iterator.
- P3220R1 "views::take_before" adds a view that produces a prefix of a range.
- P3216R1 "views::slice" adds a view that strips both a prefix and suffix from a range.

We also gave feedback on two more papers:

- P3732R1 "Numeric range algorithms" rangifies the remaining algorithm in <numeric>, the often forgotten sibling of <algorithm>.
- P2728R9 "Unicode in the Library, Part 1: UTF Transcoding" adds views that do transcoding of e.g. UTF-8 to UTF-32.

We did not manage to see three papers proposing new features and three more papers and issues that want to fix bugs. We will prioritize them at the next meeting.

SG10: Feature test (Revzin/Wakely)

SG10 did not meet.

SG14: Games & low latency (Wong)

SG14 did not meet this week. We will continue monthly meetings on the games paper and the embedded exception paper.

SG15: Tooling (Spencer/Boeckel)

SG15 did not meet.

SG16: Unicode (Honermann/Downey)

SG16 did not meet during the face-to-face meeting. We provided recommendations for 4 NB comments in advance of the Kona meeting. We will meet two more times this calendar year, once in November, once in December, and then resume our twice monthly meeting cadence in January.
We have plenty of papers in our queue to keep us busy.

SG17: EWG Incubator (Keane/Touton)

SG17 did not meet.

SG18: LEWG Incubator (Baker/Liber)

SG18 did not meet.

SG19: Machine Learning (Wong/Ratzloff)

SG19 did not meet this week, but we continue our monthly meetings. Topics: statistics and graph algorithms.
In future: exploring issues with large language models, and forming better training data for LLMs for C++ programs.

SG20: Education (van Winkel/Sattler)

SG20 did not meet.

SG22: C/C++ Liaison (Ranns/Herring, Meneide(for WG14))

SG22 did not meet.

SG23: Safety/Security (Orr/Butler)

SG23 "Safety and Security" met on Friday.

We had presentations on four papers:
P3100R5 "Implicit contract assertions"
P3578R1 "What is 'Safety'?"
P3611R0 "Dealing with pointer errors: Separating static and dynamic checking"
P3874R0 "Safety Strategy Requirements for C++"

We polled on three papers:
P3100R5 "Implicit contract assertions"
Strong consensus for the direction of P3100 and recommended its inclusion in C++29

P3578R1 "What is 'Safety'?"
Resolved that Functional Safety as described by P3578 is an important consideration when evolving C++

P3874R0 "Safety Strategy Requirements for C++"
Strongly encouraged the creation of a design in line with P3874 and agreed to forward it to EWG. Also strongly encouraged further work on P3874 with the goal of incorporating it as part of a single Standing Document.

Thank you to all who attended and to all those who agreed to be scribes.

ABI Group (Vandevoorde/Merril)

ABI group did not meet this week.

Admin (Liber)

As of this morning, we had 184 attendees this week:

- 84 in person
- 101 virtually

Someone has marked themselves to be both in person and in virtual attendance.

We had seven guests.

There were 20 national bodies present.

Post-meeting mailing scheduled for Monday, December 15.

The new Wiki has been in testing. Please take a look at the new Wiki, which we intend to use at the next meeting. It has per-user access controls and page attachments.

Evolution (Bastien/Dusíková/Keane)

EWG Met all 5 days.

We did:

Contracts:
23 National Body Comments
Rejected all but 2 requests:

- AT1-057: Allow detection of replaceability of contract violation handler
  - P3886R0 forwarded to LEWG & CWG with the wording for this.
- RO 2-056: Make contracts reliably non-ignorable
  - Conversation centered around allowing `pre!` handler with enforce semantic
  - Darius to contact interested parties (and vice versa!) to come to a consensus-paper outside of the committee
  - EWG to hold Telecons in January & February to give feedback

Trivial Relocatability:
Joint Session with LEWG:

- Accepted 2 National Body Comments, to the effect of removing Trivial Relocatability and Replaceable type.

Solo discussions:

- Rejected 9 other National Body comments as ‘moot’ due to the above.
- Forwarded D3920R0 to CWG to do said removal

Reflection:

- Asked LEWG to add `is_structural_type` to the library
- Approved 2 NB comments to allow annotations on function parameters
    - Forwarded a section of P3795R0 to CWG to accomplish this
- Debated emitting messages at compile time, ultimately rejected.
- Rejected other 6 Reflection related NB comments

We completed triage of ALL of the NB comments assigned to EWG (plus some extras), of which we rejected most, though some changes of interest:

- Asked LEWG to make uncaught_exceptions/current_exception no longer constexpr
- Did NOT have consensus to make intptr_t/uintptr_t mandatory as requested by an LEWG targeted NB comment.
- Forwarded P3726R0 to CWG to fix trivial unions in response to 2 NB comments
- Forwarded wording to CWG to allow structured bindings in for-range-decl of expansion statement
- Codified strong ownership of modules (expecting a paper)
- Forwarded 3868R0 to CWG to allow #line before module declarations in response to an NB comment
- Forwarded P3684R0 to CWG to fix erroneous behavior termination semantics in response to an NB comment

We also reviewed a number of papers, of which we:

- Encouraged further work on P2034R5 “Partially Mutable Lambda Captures”
- Approved P2243R0 “Language Linkage for templates” as a DR
- Approved P2414R10 “Pointer lifetime-end zap proposed solutions” as a DR
- Approved P3423R1 “Extending User-Generated Diagnostic Messages” for 29
- Approved P3658R1 “Adjust identifier following new Unicode Recommendations” for 29

Library Evolution (Levi/Fracassi/Weis)

LEWG met during the full week, and processed 96 issues and papers (and duplicates):

- Accepted: 45
- Rejected: 31
- Needs-paper (or wording update): 14 (these which requires design will be closed if no paper comes up in time)
- Info (papers) or other statuses: 6

(Full list of issues below)

Highlights

1. std::hive remained in C++26
2. Linear Algebra remained in C++26
3. Both constant_wrapper & nontype remained in C++26
4. Relocatability removed from C++26 (discussed during a joint EWG & LEWG session)
5. Library-related Contracts topics were all resolved, wording for standard library hardening from P3878R0 was accepted (implementations *remains* decoupled from "Contracts" features, hardened conditions evaluated with terminating semantics (enforced / quick_enforce))

Summary

We've successfully managed to tackle the majority of the comments with extensive design discussion or with large impact on the standard, leaving (mostly) renaming and smaller scope fixes. 🥳
We will continue processing remaining issues (~50) during telecons (January-February-March 2026) using our Electronic Poll process, and during the beginning of the upcoming UK March 2026 meeting.

Full minutes are available here:
https://wiki.edg.com/bin/view/Wg21kona2025/LibraryEvolutionWorkingGroup

We would like to take this opportunity to thank:

- To SG chairs and to EWG chairs, for a fruitful collaboration.
- To LWG chairs, for their tireless effort, for constructive collaboration, and for staying ahead of the queue with all the changes and updates needed.
- To all of our participants, NB comments submitters, paper authors (both original ones and fixing ones), and, of course, a special thanks to our co-chairs and minute takers (without whom, we could not effectively get to resolution and record our decisions)!

Thank you again for your participation, and see you in our upcoming telecons and in UK! 👋

Full list of issues & resolutions

Topic			Status
S/R Customization Points	US 207-328 [exec] Remove sender algorithm customization P3826	https://wiki.edg.com/bin/view/Wg21kona2025/US207	Needs-paper
	FI-331 33.9 [exec.snd] Remove sender algorithm customization P3826	https://wiki.edg.com/bin/view/Wg21kona2025/FI331	Needs-paper
	CA-358 33.9.6 [exec.snd.transform] Remove sender algorithm customization	https://wiki.edg.com/bin/view/Wg21kona2025/CA358	Needs-paper

	P3826R0 Defer Sender Algorithm Customization to C++29	https://wiki.edg.com/bin/view/Wg21kona2025/P3826	Needs-paper
	FR-031-319 33 [exec] Remove sender algorithm customization and sender adaptors	https://wiki.edg.com/bin/view/Wg21kona2025/FR031	Needs-paper
S/R connect	US 202-326 33 [exec] Support customization for GPU schedulers	https://wiki.edg.com/bin/view/Wg21kona2025/US202	Needs-paper
	CA-334 33.9.10p6 [exec.connect] Throwing connect P3388 (for C++26)	https://wiki.edg.com/bin/view/Wg21kona2025/CA334	Accepted
	CA-329 33.7.1 [exec.recv.concepts] Throwing connect P3388	https://wiki.edg.com/bin/view/Wg21kona2025/CA329	Accepted
	FR-032-330 33.7.1 [exec.recv.concepts] Throwing connect P3388	https://wiki.edg.com/bin/view/Wg21kona2025/FR032	Accepted
	P3860 R0 Proposed Resolution for NB Comment GB13-309 atomic_ref is not convertible to atomic_ref	https://wiki.edg.com/bin/view/Wg21kona2025/P3860	Accepted
S/R / async_scope	CA-393 33.14.1p2 [exec.scope.concepts] Introduce scope_association concept P3815	https://wiki.edg.com/bin/view/Wg21kona2025/CA393	Accepted
	FI-392 33.14 [exec.scope] Introduce scope association concepts P3815	https://wiki.edg.com/bin/view/Wg21kona2025/FI392	Accepted
	US 227-346 33.9.12.18 [exec.spawn.future] Incomplete types used with allocator	https://wiki.edg.com/bin/view/Wg21kona2025/US227	Accepted
	P3887 R0 Make when_all a Ronseal Algorithm	https://wiki.edg.com/bin/view/Wg21kona2025/P3887	Accepted
parallel_scheduler	RO 4-395 33.15 [exec.par.schedule] Improve parallel_scheduler P3804	https://wiki.edg.com/bin/view/Wg21kona2025/RO004	Accepted
atomic_ref	FR-030-310 32.5.7.2 [atomics.ref.ops] `std::atomic_ref::address` should return `uintptr_t`	https://wiki.edg.com/bin/view/Wg21kona2025/FR030	Needs-paper (update)
	Proposed Resolution for NB Comment GB13-309 atomic_ref is not convertible to atomic_ref	https://wiki.edg.com/bin/view/Wg21kona2025/P3860	Info
	GB13-309 32.5.7 [atomics.ref.generic] `atomic_ref\<T\>` is not convertible to `atomic_ref\`	https://wiki.edg.com/bin/view/Wg21kona2025/GB013	Accepted

std::hive	NC IT-230 23.3.8 -- [hive.syn] ABI concerns - remove std::hive	https://wiki.edg.com/bin/view/Wg21kona2025/IT230	Rejected
	US 139-232 23.3.9.1p05.4 [hive.overview] Adjust all constructors and methods on hive to throw in case specified block limits violate the conditions	https://wiki.edg.com/bin/view/Wg21kona2025/US139	Needs-paper
	CZ 1-231 23.3.8 [hive] make `std::hive` constexpr	https://wiki.edg.com/bin/view/Wg21kona2025/CZ001	Accepted
linalg	FR-029-273 29.9 [linalg] Remove linalg from C++26	https://wiki.edg.com/bin/view/Wg21kona2025/FR029	Rejected
	US 169-276 29.9.2, 29.9.13.8 Adopt LWG 4302 Problematic vector_sum_of_squares wording	https://wiki.edg.com/bin/view/Wg21kona2025/US169	Accepted
Adopt in 26	FR-028-271 28.5 [format] Adopt P3391R1 constexpr std::format	https://wiki.edg.com/bin/view/Wg21kona2025/FR028	Accepted
	GB10-269 28.5 [format] Make std::format and integer formatters usable in constant expressions.	https://wiki.edg.com/bin/view/Wg21kona2025/GB010	Accepted
	NC IT-002 Adopt P1789 Library Support for Expansion Statements (for C++26)	https://wiki.edg.com/bin/view/Wg21kona2025/IT002	Accepted
	PL-007 23.7.3.7 [mdspan.sub] [mdspan.sub] Define the extent member of the strided_slice (for C++26)	https://wiki.edg.com/bin/view/Wg21kona2025/PL007	Needs-paper
mdspan	US 168-277 29.9.2, 29.9.4.1, 29.9.14.6, 29.9.14.7, 29.9.14.8, 29.9.15.4, 29.9.15.5 Adopt P3371 Fix C++26 by making the rank-1, rank-2, rank-k, and rank-2k updates consistent with the BLAS	https://wiki.edg.com/bin/view/Wg21kona2025/US168	Accepted
	PL-008 23.7.3.7 [mdspan.sub] [mdspan.sub] Rename submdspan_extents to subextents	https://wiki.edg.com/bin/view/Wg21kona2025/PL008	Accepted
	PL-009 23.7.3.7 [mdspan.sub] [mdspan.sub] Adopt P3663 Future-proof submdspan-mapping	https://wiki.edg.com/bin/view/Wg21kona2025/PL009	Accepted
	US 152-243 23.7.3.2, 23.7.3.7 change submdspan_extents to subextents and change submdspan_canonicalize_slices to canonical_slices	https://wiki.edg.com/bin/view/Wg21kona2025/US152	Accepted
constant_wrapper & nontype	FR-021-218 22.10 [function.objects] Fix the issues with `std::nontype_t`	https://wiki.edg.com/bin/view/Wg21kona2025/FR021	Rejected
	FR-019-210 22.2.1 [utility.syn] Remove `constant_wrapper` and `nontype_t`	https://wiki.edg.com/bin/view/Wg21kona2025/FR019	Rejected

	P3792 R0 Why `constant_wrapper` is not a usable replacement for `nontype`	https://wiki.edg.com/bin/view/Wg21kona2025/P3792	Info
	P3870 R0 Renaming std::nontype to std::tag	https://wiki.edg.com/bin/view/Wg21kona2025/P3870	Rejected
	P3843R0 Reconsider R0 of P3774 (Rename std::nontype) for C++26	https://wiki.edg.com/bin/view/Wg21kona2025/P3843	Rejected
	constant_wrapper's pseudo-mutators are underconstrained	https://wiki.edg.com/bin/view/Wg21kona2025/LWG4383	Accepted
Optional<T&>	FR-020-214 22.5.2 [optional.syn] Do not make std::optional a range	https://wiki.edg.com/bin/view/Wg21kona2025/FR020	Rejected
	US 134-215 22.5.4.1 [optional.optional.ref.general] optional<T&> is a trivially copyable type	https://wiki.edg.com/bin/view/Wg21kona2025/US134	Accepted
	PL-011 22.5 [optional] Optimize for std::optional in range adaptors	https://wiki.edg.com/bin/view/Wg21kona2025/PL011	Accepted
volatile \< complex \>	AT10-403 D.15 p4/6 [depr.tuple] Support decomposition of volatile-qualified complex	https://wiki.edg.com/bin/view/Wg21kona2025/AT010	Rejected
	AT 7-213 22.4.7p6 and 8 [tuple.helper] tuple-like for cv-qualified complex	https://wiki.edg.com/bin/view/Wg21kona2025/AT008	Accepted
Contracts	FR-001-014 4.1p8 [intro.compliance] Hardened implementation should not rely on contracts	https://wiki.edg.com/bin/view/Wg21kona2025/FR001	Rejected (no change, intention Accepted)
	P3878R0 C++26 Contracts are not a good fit for standard library hardening	https://wiki.edg.com/bin/view/Wg21kona2025/P3878	Accepted
	US 3-015 4.1.1p8 [intro.compliance.general] Hardened implementation should not rely on contracts	https://wiki.edg.com/bin/view/Wg21kona2025/US003	Rejected (no change, intention Accepted)
	RU-016 4.1.1 General [intro.compliance.general] Keep hardening based on contracts	https://wiki.edg.com/bin/view/Wg21kona2025/RU016	Rejected
	US 61-112 16.3.2.4p03.4 [structure.specifications] Do not use contracts for hardening	https://wiki.edg.com/bin/view/Wg21kona2025/US061	Rejected (no change, intention Accepted)

	FR-010-113 16.3.2.4p03.4 [structure.specifications] Do not use contracts for hardening	https://wiki.edg.com/bin/view/Wg21kona2025/FR010	Rejected (no change, intention Accepted)
	GB 04-124 17.10.3p5 [support.contract.violation] Remove evaluation_exception	https://wiki.edg.com/bin/view/Wg21kona2025/GB004	Accepted
	NL 17.10.3p5 [support.contract.violation] evaluation_exception should be removed	https://wiki.edg.com/bin/view/Wg21kona2025/NL001	Accepted
Contracts cleanups	AT 1-057 6.11.3 [basic.contract.handler] Allow detection of replaceability of contract violation handler	https://wiki.edg.com/bin/view/Wg21kona2025/AT001	Accepted
	AT 6-229 23.3.3.5p3 [array.zero] Hardened precondition for zero-length array front/back	https://wiki.edg.com/bin/view/Wg21kona2025/AT006	Accepted
Relocatability	US 166-266 26.11.1 [specialized.algorithms.general] P3516 Adopt Uninitialized algorithms for relocation (for C++2^)	https://wiki.edg.com/bin/view/Wg21kona2025/US166	Rejected (feature pulled from 26)
	RO 1-134 20.2.6 [obj.lifetime] Add a `start_lifetime_at` function P3858	https://wiki.edg.com/bin/view/Wg21kona2025/RO001	Rejected (feature pulled from 26)
	US 73-131 20.2.2, 20.2.6 Cleaning up the trivial relocation APIs	https://wiki.edg.com/bin/view/Wg21kona2025/US073	Rejected (feature pulled from 26)
	CA-133 20.2.6 [obj.lifetime] Remove `std::relocate`	https://wiki.edg.com/bin/view/Wg21kona2025/CA133	Rejected (feature pulled from 26)
	CA-136 20.2.6p16 [obj.lifetime] Allow const-qualified types for `relocate`	https://wiki.edg.com/bin/view/Wg21kona2025/CA136	Rejected (feature pulled from 26)
	CA-137 20.2.6p9 [obj.lifetime] Allow const-qualified types for `trivially_relocate`	https://wiki.edg.com/bin/view/Wg21kona2025/CA137	Rejected (feature pulled from 26)
EWG-LEWG Joint Relocatability session		https://wiki.edg.com/bin/view/Wg21kona2025/EWGTrivialRelocation	
inplace_vector	US 138-224 [inplace.vector] `inplace_vector` should be allocator-aware	https://wiki.edg.com/bin/view/Wg21kona2025/US138	Rejected
	US 149-226 23.3.16 [inplace.vector] Do not redesign `std::inplace_vector`	https://wiki.edg.com/bin/view/Wg21kona2025/US149	Pending other NB comments
	FR-022-227 23.3.16 [inplace.vector] modify inplace_vector to throw a different exception when size exceeds capacity	https://wiki.edg.com/bin/view/Wg21kona2025/FR022	Rejected

Task Type	US 246-373 33.13.6.2 [task.class] Support symmetric transfer LWG4348	https://wiki.edg.com/bin/view/Wg21kona2025/US246	Needs-paper
	US 245-374 33.13.6.2 [task.class] Add operator co_await LWG4338	https://wiki.edg.com/bin/view/Wg21kona2025/US245	Rejected
	US 255-384 33.13.6.5 [task.promise] Use allocator from receiver's environment LWG4335	https://wiki.edg.com/bin/view/Wg21kona2025/US255	Accepted
	US 253-386 33.13.6.5 [task.promise] Allow use of arbitrary allocators for coroutine frame LWG4333	https://wiki.edg.com/bin/view/Wg21kona2025/US253	Needs-paper (wording update)
Reflection	FR-016-162 21.4.1 [meta.syn] Disallow reflecting on parameter names in C++26	https://wiki.edg.com/bin/view/Wg21kona2025/FR016	Rejected
	US 129-191 21.4.17 [meta.reflection.traits] is_*_type should imply is_type P3781	https://wiki.edg.com/bin/view/Wg21kona2025/US129	Rejected
	DE-194 21.4.17 [meta.reflection.traits] is_*_type should imply is_type P3781	https://wiki.edg.com/bin/view/Wg21kona2025/DE194	Rejected
	P3795 R0 Miscellaneous Reflection Cleanup	https://wiki.edg.com/bin/view/Wg21kona2025/P3795	Accepted (excluding 2.1)
	US 85-150 21.4 [meta.reflection] Specifying Error-Handling More Precisely (P3795)	https://wiki.edg.com/bin/view/Wg21kona2025/US085	Accepted (resolved by P3795 with update)
	US 122-184 21.4.16 [meta.reflection.define.aggregate] Rearrange data_member_spec interface	https://wiki.edg.com/bin/view/Wg21kona2025/US122	Accepted
	US 128-192 21.4.17 [meta.reflection.traits] Add reflection support for is_applicable, is_nothrow_applicable, and apply_result P3795	https://wiki.edg.com/bin/view/Wg21kona2025/US128	Accepted
	US 95-202 21.4.7 [meta.reflection.queries] Add is_inline, is_constexpr, is_consteval predicates for reflection P3795	https://wiki.edg.com/bin/view/Wg21kona2025/US095	Rejected
	US 100-207 21.4.8 [meta.reflection.access.context] Improve user experience for current scope	https://wiki.edg.com/bin/view/Wg21kona2025/US100	Accepted
	FR-015-161 21.4.1 [meta.syn] Remove `meta::info::has_default_argument`	https://wiki.edg.com/bin/view/Wg21kona2025/FR015	Rejected
	PL-010 21.4.1 [meta.syn] `std::meta` functions should not be addressable functions	https://wiki.edg.com/bin/view/Wg21kona2025/PL010	Rejected

	US 85-150 21.4 [meta.reflection] Specifying Error-Handling More Precisely (P3795)	https://wiki.edg.com/bin/view/Wg21kona2025/US085	Accepted(P3795 with update)
	BDS 1-154 21.4 [meta.reflection] specifies the content of exceptions thrown by reflection functions	https://wiki.edg.com/bin/view/Wg21kona2025/BDS1	Accepted (P3795 with update)
	P3802 R0 Poor Functions	https://wiki.edg.com/bin/view/Wg21kona2025/P3802	Supported (post 26)
SIMD	RO 3-292 29.10.8.3 [simd.comparison] Make basic_simd a regular type (with boolean operator==)	https://wiki.edg.com/bin/view/Wg21kona2025/RO003	Rejected
	DE-287 29.10.7.2p17 & p18 [simd.ctor] Missing deduction guide	https://wiki.edg.com/bin/view/Wg21kona2025/DE287	Accepted
	DE-286 29.10.7.2p1–4 [simd.ctor] Add consteval broadcast constructor from constant integer (P3844)	https://wiki.edg.com/bin/view/Wg21kona2025/DE286	Accepted
	P3844 R0 Restore simd::vec broadcast from int	https://wiki.edg.com/bin/view/Wg21kona2025/P3844	Accepted
	AT8-279 29.10.3 [simd.syn] Add reduction overloads for non-simd, vectorizable types P3690	https://wiki.edg.com/bin/view/Wg21kona2025/AT008	Accepted
	US 176-280 29.10.3 [simd.syn] Disallow user specialization of simd templates	https://wiki.edg.com/bin/view/Wg21kona2025/US176	Accepted
std::indirect	US 77-140 20.4.1 [indirect] Add conversion operators to std::indirect	https://wiki.edg.com/bin/view/Wg21kona2025/US077	Rejected
	P3902 R0 Against implicit conversions for indirect	https://wiki.edg.com/bin/view/Wg21kona2025/P3902	Info
Renaming	FR-024-245 25 [ranges] Rename reserve_hint to approximate_size	https://wiki.edg.com/bin/view/Wg21kona2025/FR024	Rejected
	P3828 R0 Rename the "to_input" view to "as_input"	https://wiki.edg.com/bin/view/Wg21kona2025/P3828	Accepted
	DE-248 25.7.35 [range.to.input] Proposed change: Rename the view "to_input" should to "as_input" (P3828)	https://wiki.edg.com/bin/view/Wg21kona2025/DE248	Accepted
	US 189-304 31.12.6.1, 31.12.6.5.6, 31.12.6.5.7, D.22.2 rename filesystem::path methods	https://wiki.edg.com/bin/view/Wg21kona2025/US189	Accepted

	FR-035-337 33.9.12 [exec.adapt] Rename {simple_,}counting_scope	https://wiki.edg.com/bin/view/Wg21kona2025/FR035	Needs-paper
	US 214-355 33.9.2p41 [exec.snd.expos] Avoid overloaded comma operators	https://wiki.edg.com/bin/view/Wg21kona2025/US214	Accepted
atomic_ref	FR-030-310 32.5.7.2 [atomics.ref.ops] `std::atomic_ref::address` should return `uintptr_t`	https://wiki.edg.com/bin/view/Wg21kona2025/FR030	Needs-paper (update)
	P3860 R0 Proposed Resolution for NB Comment GB13-309 atomic_ref is not convertible to atomic_ref	https://wiki.edg.com/bin/view/Wg21kona2025/P3860	Needs-revision

Core (Maurer/Merrill/Caves)

Core met all week and will continue unofficially today 1–4 PM.
Of ~60 NB comments assigned to CWG:

- ~33 on track to be accepted
- 9 rejected
- 3 duplicates
- ~15 open issues, awaiting papers

Heads-up: if papers don't show up, NB comments go to "rejected" by default; might still merit a core issue later.

Thanks to Brian Bi for scribing the whole week. This was especially tough because we were doing rapid-fire issues.

76 issues have been readied. Majority of NB resolutions are embedded in those issues.
There are a few papers too.

Important item: Core Issue 1670 - after consulting with EWG, declaration of `operator auto` conversion function is ill-formed. Not everyone is happy with this resolution, so I have a request to split the poll so people can vote separately.

Agreement to split core issue 1670 into a separate poll.

CWG polls

1. Accept as Defect Reports and apply the proposed resolutions of all issues except issues 1670, 2917, 2923, 3005, 3043, 3044, 3045, 3048, 3053, 3061, 3063, 3074, 3082, 3084, 3089, 3092, 3093, 3094, 3095, 3098, 3099, 3101, 3108, 3109, 3110, 3113, 3114, 3115, 3117, and 3118 in P3921R0 (Core Language Working Group "ready" Issues for the November, 2025 meeting) to the C++ Working Paper.

No discussion
No objection to unanimous consent
Approved.

2. Apply the proposed resolutions of issues 2917, 2923, 3005, 3043, 3044, 3045, 3048, 3053, 3061, 3063, 3074, 3082, 3084, 3089, 3092, 3093, 3094, 3095, 3098, 3099, 3101, 3108, 3109, 3110, 3113, 3114, 3115, 3117, and 3118 in P3921R0 (Core Language Working Group "ready" Issues for the November, 2025 meeting) to the C++ Working Paper.

No discussion
No objection to unanimous consent
Approved.

2b. Accept as Defect Reports and apply the proposed resolutions of issue 1670 in P3921R0 (Core Language Working Group "ready" Issues for the November, 2025 meeting) to the C++ Working Paper.

Concern raised: adopting this resolution makes an example elsewhere in the standard ill-formed.
Examples are non-normative; the example can be updated later without a DR
Was this discussed in CWG ?
No, but this is not the first time this happened.
Question raised about whether EWG discussed grammar constraints for conversion operators.
This was not brought up in EWG.
Suggestion to postpone for one meeting.

Objection in the room.
Guy Davidson explains the voting rules.
In favour: 43 in room + 25 online = 68
Opposed: 1 in room + 14 online = 15
Abstain: 14 in room + 12 online = 26
Approved

3a. Postpone vote 3b to the UK meeting in March 2026, and relitigate P3920R0 in an LEWG/EWG joint session at that meeting.

This is a procedural poll asking: should we take poll 3b today given procedural concerns?
It was argued that the subgroup discussions on trivial relocation had already demonstrated very strong consensus in favor of removing the feature for C++26. Delaying the decision was viewed as an unnecessary procedural detour and a way to undermine or bypass that consensus.

It was explained that multiple procedural complaints had been raised. More specifically, that not all relevant technical papers and NB comments had been heard before the subgroup's removal vote.
It was clarified that this motion did not represent an attempt to override subgroups.
Instead, the intent was to give plenary the chance to decide whether it felt the procedure had been handled properly, since plenary is the approving body.

Some participants argued that re-hearing NB comments or technical papers would not have changed the subgroup outcome, because later discussions only reinforced the conclusion.

The purpose behind poll 3a was reiterated:
In ISO process, ensuring that all concerned voices are heard is critical.
Since procedural concerns had been raised, plenary needed to explicitly decide whether the process had been fair enough to proceed.

By the time of plenary discussion, those who originally raised the procedural concerns had indicated informally that they were now satisfied and did not object to proceeding.

Objection in the room.
In favour: 1 in room + 4 online = 5
Opposed: 51 in room + 35 online = 86
Abstain: 9 in room + 11 online = 20
Motion does not pass.

3b. Apply the changes in P3920R0 (Wording for NB comment resolution on trivial relocation) to the C++ Working Paper. This addresses numerous ballot comments (see paper).
[Note (not part of motion): Removes trivial relocation from the Working Draft, reverting P2786R13 Trivial Relocatability for C++26. -- end note]

Statement in the room : during the two discussions, both in LEWG and in EWG, the implementers of our major tools unanimously and independently were unable to support this particular version of this feature. From the reading of those rooms, that was the tipping point. They could not support it, either because they didn't understand how to implement it, or for other reasons.

Objection in the room.
In favour: 44 in room + 36 online = 80
Opposed: 3 in room + 2 online = 5
Abstain: 13 in room + 15 online = 28
Approved.

4. Accept as a Defect Report and apply the changes in P3868R1 (Allow #line before module declarations) to the C++ Working Paper. This addresses ballot comment US 55-102.

No discussion
No objection to unanimous consent
Approved.

5. Apply the changes in P3684R1 (Fix erroneous behaviour termination semantics for C++26) to the C++ Working Paper. This addresses ballot comment GB 02-036.

No discussion
Objection in the room.
In favour: 36 in room + 24 online = 60
Opposed: 3 in room + 9 online = 12
Abstain: 8 in room + 12 online = 20
Approved.

Library (Wakely/Garland/Kuhl)

Library worked incredibly hard all week, but largely avoided burning ourselves out or fighting with each other as the deadline approached, so that's nice!

We're doing a good job of delegating and distributing work. We had new people creating library issues directly in the repo, rather than using Daniel Kruegler to enter them into the lists. At various times we had all three of me, Jeff and Dietmar out of the room, but everything still ran smoothly.
Thanks to Bryan and Christian for chairing, and to Robert and our other scribes.

LWG is done for the week, we won't have any zombie sessions today.
We'll resume telecons in a few weeks, to get more work done before Croydon.
No specific plans or date for resuming those telecons yet, watch the calendar.

Our first two polls are the usual omnibus papers of library issues, totalling well over 100 issues, including library issues that address NB comments but also some high priority issues and low-hanging fruit that were resolved, without directly addressing any NB comment. Another two polls are papers we approved in telecons, but the rest of our polls were all approved this week. The majority are addressing NB comments, but a couple are just small cleanup papers, addressing library issues (so business as usual).

I think all the library issues in the first two polls have a link to a related NB comment when the issue is addressing a comment, although we might have missed some. The other polls should also mention the NB comments that they address, but again I might have missed some. I don't have exact numbers for how many NB comments we've dispensed with so far, but Jeff tells me it's about 100. We're very happy with our progress and are in a good position to deal with the remainder in Croydon.

We did look at a handful of issues and topics which weren't ready for the polls today so we'll revisit those. But nearly everything we looked at has been approved by LWG and is presented for your consideration in the polls today.

LWG polls

1. Apply the changes in P3905R0 (C++ Standard Library Ready Issues to be moved in Kona, Nov. 2025) to the C++ working paper.

No discussion
No objection to unanimous consent
Approved.

2. Apply the changes in P3906R0 (C++ Standard Library Immediate Issues to be moved in Kona, Nov. 2025) to the C++ working paper.

No discussion
No objection to unanimous consent
Approved.

3. Apply the changes in P3016R6 (Resolve inconsistencies in begin/end for `valarray` and braced initializer lists) to the C++ working paper.

No discussion
No objection to unanimous consent
Approved.

4. Apply the changes in P3567R2 (`flat_meow` fixes) to the C++ working paper.

No discussion
No objection to unanimous consent
Approved.

5. Apply the changes in P3663R3 (Future-proof `submdspan_mapping`) to the C++ working paper. This addresses ballot comments US 66-117 and PL 009.

No discussion
No objection to unanimous consent
Approved.

6. Apply the changes in P3914R0 (Assorted NB comment resolutions for Kona 2025) to the C++ working paper. This addresses ballot comments US 160-260, US 209-332, US 228-348, US 263-396, US 265-398, US 266-399, US 112-172, and US 130-193.

No discussion
No objection to unanimous consent
Approved.

7. Apply the changes in P3836R2 (Make `optional<T&>` trivially copyable) to the C++ working paper. This addresses ballot comment US 134-215.

No discussion
No objection to unanimous consent
Approved.

8. Apply the changes in P3860R1 (Proposed Resolution for NB Comment GB13-309 `atomic_ref< T >` is not convertible to `atomic_ref< const T >`) to the C++ working paper, as a Defect Report for C++20. This addresses ballot comment GB13-309.

No discussion
No objection to unanimous consent
Approved.

9. Apply the changes in P3388R3 (When Do You Know `connect` Doesn't Throw?) to the C++ working paper.

No discussion
No objection to unanimous consent
Approved.

10. Apply the changes in P3774R1 (Rename `std::nontype`, and make it broadly useful) to the C++ working paper. This addresses ballot comments FR-021-218 and FR-019-210.

No discussion.
Objection in the room.
In favour: 30 in room + 16 online = 46
Opposed: 1 in room + 6 online = 7
Abstain: 15 in room + 22 online = 37
Approved.

11. Apply the changes in P3819R0 (Remove `evaluation_exception()` from contract-violation handling for C++26) to the C++ working paper. This addresses ballot comments NL, US 69-125, GB 04-124.

No discussion
No objection to unanimous consent
Approved.

12. Apply the changes in P3612R1 (Harmonize proxy-reference operations (LWG 3638 and 4187)) to the C++ working paper.

No discussion
No objection to unanimous consent
Approved.

13. Apply the changes in P3778R0 (Fix for `type_order` template definition) to the C++ working paper.

No discussion
No objection to unanimous consent

Approved.

14. Apply the changes in P1789R3 (Library Support for Expansion Statements) to the C++ working paper. This addresses ballot comments NC IT-002, FR 007-011-142, CZ 2-143, US 78-144.

No discussion
No objection to unanimous consent
Approved.

15. Apply the changes in P3922R1 (Missing deduction guide from `simd::mask` to `simd::vec`) to the C++ working paper. This addresses ballot comment DE-287.

No discussion
No objection to unanimous consent
Approved.

16. Apply the changes in P3815R1 (Add `scope_association` concept to P3149) to the C++ working paper. This addresses ballot comments CA-393 and FI-392.

No discussion
No objection to unanimous consent
Approved.

17. Apply the changes in P3878R1 (Standard library hardening should not use the 'observe' semantic) to the C++ working paper. This addresses ballot comments RU-016, FR-001-014, FR-010-113, US 3-015, and US 61-112.

No discussion
No objection to unanimous consent
Approved.

18. Apply the changes in P3887R1 (Make `when_all` a Ronseal Algorithm) to the C++ working paper.

No discussion
No objection to unanimous consent
Approved.

19. Apply the changes in P3923R0 (Additional NB comment resolutions for Kona 2025) to the C++ working paper. This addresses ballot comments AT 7-213, US 140-233, US 141-235, US 145-234, US 147-240, US 164-203, US 126-189, US 227-346, US 229-347, US 221-339, and US 225-341

No discussion
No objection to unanimous consent

Approved.

20. Apply the changes in P3371R5 (Fix C++26 by making the rank-1, rank-2, rank-k, and rank-2k updates consistent with the BLAS) to the C++ working paper. This addresses ballot comment US 168-277.

No discussion
No objection to unanimous consent
Approved.

21. Apply the changes in P3391R2 (`constexpr std::format`) to the C++ working paper. This addresses ballot comment FR 028-271 and US 167-270.

No discussion.
Objection in the room.
In favour: 29 in room + 25 online = 54
Opposed: 0 in room + 5 online = 5
Abstain: 11 in room + 15 online = 26

22. Apply the changes in P3913R1 (Optimize for std::optional in range adaptors) to the C++ working paper. This addresses ballot comment PL-011.

No discussion
No objection to unanimous consent
Approved.

Direction Group (Wong)

DG always meets at every face-to-face meeting.
At this meeting we discussed and summarised our views and reviewed strategic challenges.

We observed many spirited discussions this week. From a long-term perspective, this is not unusual. It's similar to what we had in C++11, 14, 17, 20, and 23.

The primary DG topic was the long-overdue update to P2000, our directions paper.
We are actively revising it. It was delayed due to long-term discussions about major topics.

We plan to provide more frequent updates and split P2000 into two papers:

- a short-term directions paper for C++29.
- long-term directions paper (successor to P2000).

We continue to encourage individuals to share their own visions for both short- and long-term C++ directions.

We thank everyone for their hard work. We have several critical ecosystem challenges ahead as we work toward C++29. We will outline these in the upcoming paper.

8. Closing activities

8.1 Issues delayed until today

There was an implementers meeting on Thursday evening. There were about 20 people in the room and another 6–7 online. It was a very productive two-hour meeting. A lot of issues were raised and suggestions made.

We will probably meet again. If you want to participate because you're an implementer, message Nina Ranns. For now, we keep it closed so implementers can voice issues freely. We plan to bring a paper to the Plenary in the UK summarizing all the points in order to start a discussion with the broader committee.

The room thanks Herb Sutter for his many years of service. Here are some of the things that have happened in the last 25 years.
Participation has grown by just about an order of magnitude, and we have approximately six times more national bodies.
We have added one working group and 23 study groups, even though some are now dormant, having completed their tasks.
We've published five international standards; a sixth is well at hand. And we are using Herb's train model on the three-year cadence.
We've had TRs and TSes.
We expanded our meetings from twice a year for five days, to three times a year for six days.
We've introduced remote participation and online meetings.
We've made extensive use of the wiki.
We have the isocpp.org website.
There's the C++ Foundation, which focuses attention worldwide on our favourite programming language.
Herb has contributed technically as well, not just in a leadership role.

The room welcomes the new convener, Guy Davidson.
Guy will review leadership roles; chairs can expect an email. The titles will be chairs and vice chairs.
There is now a convenership team : Jeff Garland and Nina Ranns are vice conveners.

Guy thanks all the volunteers for the secretary position.
The new WG21 secretary will be appointed after Kona : Braden Ganetsky.

The room thanks John Spicer for his many years of service as the plenary chair.
The room thanks EDG for their contribution to C++.

8.2 Mailings

Note: These are the closest regular mailings and not special pre/post meeting mailings.

2025-12-15: Post-Kona
2026-02-23: Pre-London

8.3 Plans for the future

No discussion.

8.4 Next and following meetings

Thank you to the sponsors of this meeting and the people who made it run smoothly.

The upcoming meetings are :

- 2026-03-23 to 28: Croydon, London, UK; Phil Nash
- 2026-06-08 to 13: Brno, Czechia; Mendel University in Brno
- 2026-11-16 to 21: Búzios, Rio De Janeiro, Brazil; C++ Alliance
- 2027-winter: (tentative) Istanbul, Turkey
- 2027-summer: (tentative) Sofia, Bulgaria
- 2027-autumn: (tentative) Budapest, Hungary
- 2028-winter: Kona, HI, USA
- 2028-summer: (tentative) Madrid
- 2028-autumn: (tentative) Crete

9. Adjournment

Meeting adjourned.

10. Attendance

Attendee	National Body
Adams, Michael	SCC
Akkaoui, Mohamed Ayoub	UNMZ
Alday, Juan	ANSI
ALEXANDRESCU, Andrei Cristian	ASRO
Arutyunyan, Ruslan	ANSI
Ažman, Gašper	BSI
Bagdonas, Ignas	BSI
Baker, Billy	ANSI
Baker, Lewis	ANSI
Balog, Pal	ANSI
Banglawala, Neelofer	BSI
Bastien, Jean-François	SCC
Bauman, Jon	ANSI
Berne, Joshua	ANSI
Bi, Brian	ANSI
Bindels, Peter	NEN
Birbacher, Frank	ANSI
Boeckel, Ben	ANSI

Boehm, Hans	ANSI
Bonaventura, Xavier	DIN
Bott, Harold	ANSI
Brito Gadeschi, Gonzalo	ANSI
Brown, Walter E.	SII
Büttner, Sebastian	ANSI
ÇAĞRI, Murat Can	TSE
Cardoso de Souza Rodrigues, Guilherme	ASI
Cassagnes, Aurelien	ANSI
Caves, Jonathan	ANSI
Chen, Yuxuan	ANSI
Childers, Wyatt	ANSI
Coe, Jonathan Brian	BSI
Cooksey, Simon	BSI
Craig, Philip	BSI
Cranmer, Joshua	ANSI
D'Angelo, Giuseppe	ANSI
Dave, Jagrut	ANSI
Davidson, Guy	BSI
de Wever, Mark	ANSI
Dhillon, Amritpal	ANSI
Dominiak, Michał	PKN
DOS REIS, Gabriel	AFNOR
Doumler, Timur	BSI

Downey, Steve	ANSI
Dusikova, Hana	UNMZ
Engert, Daniela	DIN
Fertig, Andreas	DIN
Fiselier, Eric	SCC
Floyd, Paul	ANSI
Fracassi, Fabio	DIN
Ganetsky, Braden	SCC
García Sánchez, José Daniel	UNE
Garg, Lakshay	ANSI
Garland, Jeff	ANSI
Gayatri, Rahulkumar	ANSI
Genovese, Walter	ANSI
Goldblatt, David	ANSI
Goodspeed, Nathaniel	ANSI
Gordon, Fraser	SCC
Gruber, Bernhard	ANSI
Guiton, Dominic	ANSI
Gustafsson, Bengt	SIS
Hagins, Jody	ANSI
Halpern, Pablo	ANSI
Hava, Michael Florian	ASI
Haynes, Graham	BSI
Herring, Davis	ANSI

Hoemmen, Mark	ANSI
Honermann, Tom	ANSI
Hopkinson, Eugene	BSI
Hrenka, Peter	DIN
Hughes, Lori	ANSI
Hunt, Oliver	ANSI
JABOT, Corentin	AFNOR
Kamiński, Tomasz	PKN
Kashri, Coral	ANSI
Katz, Dan	ANSI
Kawulak, Robert	PKN
Keane, Erich	ANSI
Koeppe, Thomas	ANSI
Kosunen, Elias	SFS
Kozicki, Bronek	ANSI
Kozicki, Bronek	BSI
Kretz, Matthias	DIN
Krzemienski, Andrzej	PKN
Kuhl, Dietmar	ANSI
Lakos, John	ANSI
Lapkowski, Christopher	ANSI
Larson, Brad	ANSI
Lauko, Henrich	UNMZ
Leahy, Robert	SCC

Lebrun-Grandie, Damien	ANSI
Lee, Hyungjin	ANSI
Levi, Inbal	ANSI
Levi, Inbal	SII
Li, Yihe	ANSI
Liber, Nevin	ANSI
Lippincott, Lisa	ANSI
Liyanaarachchi, Chanaka	ANSI
Lopes, Bruno	ABNT
Lopes, Bruno	ANSI
López Gómez, Javier	UNE
Machutova, Jana	UNMZ
Marr, Greg	ANSI
Matt, Cummins	ANSI
Maurer, Jens	ANSI
McDougall, Ryan	ANSI
McKenney, Paul	ANSI
Meerwald, Christof	ASI
Meredith, Alisdair	ANSI
Michael, Maged	ANSI
Miller, Cody	ANSI
Morales, Nicolas	ANSI
Moschovakos, Paris	SNV
Mueller, Gideon	ANSI

Müller, Jonathan	DIN
Myers, Nathan	ANSI
Neațu, Darius	ASRO
NICHITA, Radu	ASRO
Niebler, Eric	ANSI
Nishanova, Anzhela	ANSI
Nolan, Edward	ANSI
O'Dwyer, Arthur	ANSI
Orr, Roger	BSI
Owen, Nathan	ANSI
Peacock, Antony	BSI
Pelliccioni, Fernando	ANSI
Persson, Jonas	SIS
Petersen, Ian	ANSI
Polukhin, Anton	GOST R
Preney, Paul	SCC
Prince, Tim	ANSI
Pusz, Mateusz	ANSI
Pusz, Mateusz	PKN
Ranns, Nina Dinka	BSI
Ratzloff, Phil	ANSI
Revzin, Barry	ANSI
Rivera Morell, René Ferdinand	ANSI
Ronkainen, Jari	SFS

Rosten, Oliver	BSI
Roy, Patrice	SCC
Ryan, Christopher	ANSI
Sandoe, Iain	BSI
Sankel, David	ANSI
Satle, Ankur	BIS
Schultke, Jan	ANSI
Serebrennikov, Vladislav	ANSI
Seymour, William	ANSI
Snyder, Jeff	BSI
Song, Tim	ANSI
Spencer, Michael	ANSI
Spicer, John	ANSI
St. Amour, Bryan	SCC
Starosz, Sebastian	PKN
Sutter, Herb	ANSI
Taylor, Matthew	BSI
TEODORESCU, Lucian Radu	ASRO
Teoh, Joon Nam	ANSI
Tong, Hubert	SCC
Trott, Christian	ANSI
Tsaousis-Seiras, Isidoros	ANSI
Vandevoorde, Daveed	ANSI
Vasama, Lauri	SFS

Voicu, Alexandru	ANSI
Vollmann, Detlef	SNV
Voutilainen, Ville	SFS
Wakely, Jonathan	ANSI
Walker, Kelly	ANSI
Wang, Mingxin	SAC
Waterloo, Jarrad	ANSI
Weis, Andreas	ANSI
Williamson, Gerald	ANSI
Wong, Jessica	ANSI
Wong, Michael	SCC
Xie, Hui	BSI
Yacobi, Tal	ANSI
Yaghmour, Shafik	ANSI
Zverovich, Victor	ANSI
ADAM David Alan Martin	ANSI
Jorge Pinto de Sousa	IPQ
Matthias Wippich	DIN
Mike Harrold	ANSI
Robert Douglas	ANSI
Viacheslav Luchkin	GOST R
Butler, Matthew	ANSI
Touton, James	ANSI
Louis Dionne	SCC

Lénárd Szolnoki	BSI
Varlamov, Konstantin	ANSI
Macieira, Thiago	ANSI
Chuanqi Xu	SAC